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MOTOR AGE

VOLUME XXI CHICAGO, APRIL 18, 1912 NUMBER 16

LOZIER 1913

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Double Magneto—Triple Ignition—Automatic Oil Levels
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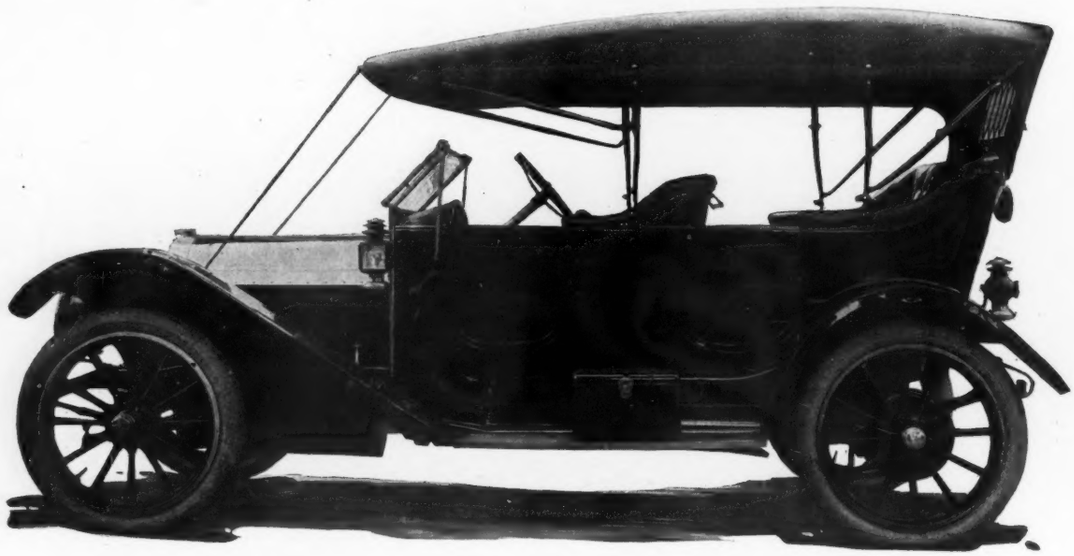

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MOTOR AGE

Published by the
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CHICAGO ILLINOIS

Volume XXI APRIL 18, 1912 No. 16

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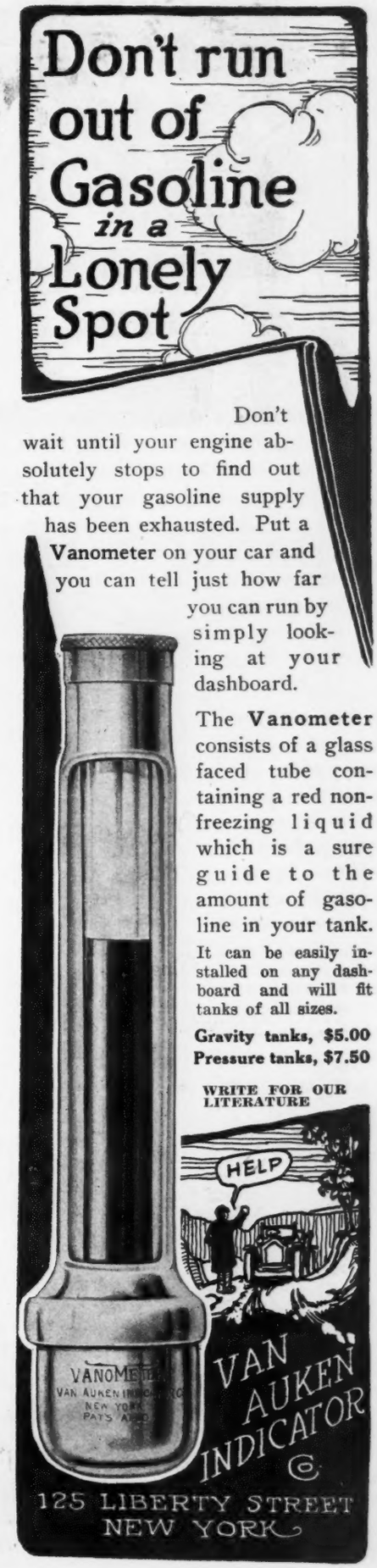
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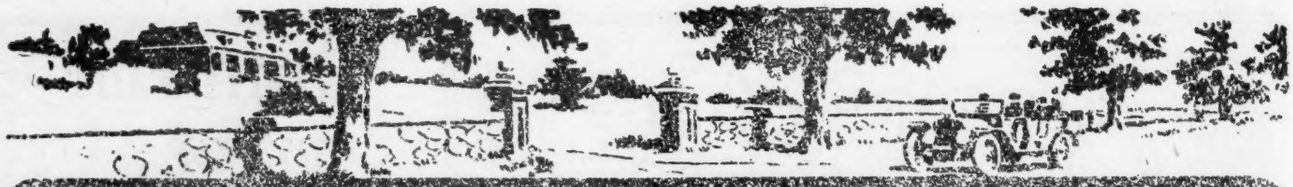

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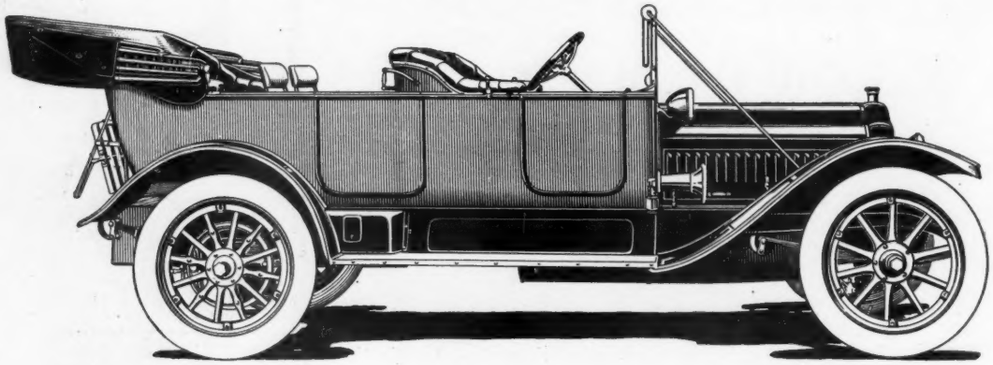

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MANUFACTURERS OF GASOLINE MOTOR CARS, TRUCKS AND TAXICABS

VOL. XXI, No. 16 CHICAGO, APRIL 18, 1912 $3.00 PER YEAR

MOTOR AGE

Legal Compass for Motor Tourists

Digest of the State Laws as They Affect the Car Owner—Action of Various Legislatures During Past Winter Has Not Been Radical—Reciprocity in Thirty-Two Commonwealths and District of Columbia

"Motoring's equilibrium was not much disturbed by the actions of the various state legislatures during the past winter"

By C. G. Sinsabaugh

MOTORING'S equilibrium was not much disturbed by the actions of the various state legislatures during the past winter and owners of cars can start in the new touring season with the knowledge that many of the obstacles that formerly were thrown in their path by lawmakers who were antagonistic to the new method of transportation, have been removed; that now it no longer is a mark of distinction to be the possessor of a motor car because the use of that vehicle has become almost universal throughout this great country of ours and so the solons are trimming their sails accordingly.

What few ripples there are in the legislative sea are occasioned by the greed of some states to exact as much as possible in the way of tribute from motorists by means of the registration fees, but outside of that one point the way

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"New Jersey is the most recent recruit in the reciprocity group"

of the motorists has been smoothed out by sane legislation. Speed laws in most states are reasonable. Much of the red tape that formerly existed has been cut and especially with the tourist has the greatest consideration been shown. This is demonstrated by the fact that right now there are only three states in which the visiting motorist cannot enter without having to take out new tags. Texas, Tennessee and Maryland are the black sheep in this instance, but it is hoped that the effects of the good legislation enacted by sister states will whip these commonwealths into line inside the next year or so. Maryland is aiming at this now and the others are expected to follow suit and thus makes a happy motoring family.

The Reciprocity Group

Probably the most striking feature of the present situation is the growth of reciprocity, and from the records compiled by the Touring Club of America one finds that there are thirty-two states and the District of Columbia which are in the reciprocity group, by which is meant those states which recognize the registration tags of other commonwealths where the same interchange of courtesies is offered. New Jersey is the most recent recruit in this group and the victory undoubtedly is the greatest the motorists ever have achieved in this country. With New Jersey in the lineup, the reciprocity group now is made up of the following states and the District of Columbia:

Alabama	New York
Arkansas	New Hampshire
California	North Carolina
Connecticut	North Dakota
Delaware	New Jersey
District of Columbia	Ohio
Florida	Oregon
Illinois	Pennsylvania
Indiana	Rhode Island
Iowa	South Dakota
Kentucky	Utah
Maine	Vermont
Massachusetts	Virginia
Michigan	Washington
Minnesota	West Virginia
Missouri	Wisconsin
Nebraska	

No provision for non-resident tourists is made in the motor laws of Kansas, Montana or South Carolina, but in those states no attempt is made to bar the visitor. Arizona, Georgia, Louisiana, Nevada, Wyoming, Colorado, Idaho, Mississippi, New Mexico and the territory of Oklahoma are shy on motor laws, but it is understood that in these states steps have been taken to plug up the holes in the motor armor.

Maryland to Change

In justice to Maryland it must be stated that even if it is outside of the reciprocity group at the present time, there is every reason to believe it will not be for long. The present law exempts non-residents for two periods of 7 days each in 1 year, providing non-resident tags are secured from the commissioner of motor vehicles. Non-resident tags may be secured from the Chicago, New York and Washington offices of the Touring Club of America. The Goslin bill, now pending, will do away with this red tape, though.

Mississippi will have a new law on June 1 which will permit cars from other states to be operated in Mississippi for 30 days without paying the state law. This new measure taxes on horsepower —$5 for under 25 horsepower, and $25 for from 25 to 40 horsepower. No further taxing of motor cars will be permitted.

Massachusetts has a legislative fight on its hands at the present time which, however, is more of interest to the residents of the Bay State than to outsiders, for the measure that is proposed seeks to greatly increase the registration fees. Kentucky only recently escaped a black eye when the motorists banded together and defeated the Newcomb bill, a measure that was so obnoxious that many of the dealers in Louisville declared they would go out of business if it passed. The defeat of this measure leaves Kentucky in the same position it was before, which is apparently to the liking of the motorists.

Motor Legislation Pending

At the present time there is motor legislation pending in Arizona, Georgia, Louisiana, Nevada, Wyoming, Colorado, Idaho, New Mexico and the territory of Oklahoma, but nothing radical is expected of any of them. In nearly every instance these states have no motor laws at the present time. Some govern by city ordinances, while Nevada is unique in having just one motor clause, which reads: "Any person or persons, firms, company, corporation or association who keeps or uses motor cars of any description for hire or rent shall obtain from the sheriff of the county in which such business is transacted, a license for the transaction of such business and pay therefor the sum of $2.50 a month."

Several of the states have enacted new laws within the past year which went into effect during the summer of 1911. Illinois started enforcing its new measure July 1, the feature of which was the change from an annual flat registration fee to one based on a horsepower rating and which also set an arbitrary limit on the wheel tax that could be collected by the various cities and towns. Missouri's new law went into effect August 1 as did Oregon's. New Hampshire changed December 31. In each instance the state adopted a horsepower rating for registrations. New Jersey changed only recently and the cause of this was to permit of

reciprocity. At the same time the Jerseymen jumped their registration fees considerable. Mississippi has a new law which becomes operative June 1, as mentioned above. Iowa, Minnesota, Maine and Nebraska also have changed during the year.

At the present time there are fourteen states which charge for registration on a horsepower basis—Alabama, Connecticut, Illinois, Kentucky, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Oregon, Pennsylvania, Rhode Island, Vermont, and Virginia. Mississippi will make the fifteenth. California, Florida, Georgia, Iowa, Texas and Utah are examples of perpetual licenses for the operation of motor cars. South Carolina, while having a motor law, makes no provisions whatsoever for registration.

Not So Much Red Tape

Tourists in studying over the regulations for the season of 1912 will find that there is not so much red tape as usual. Even invading Canada is not so hard as it used to be. A motorist wishing to take a car into the dominion for touring purposes for 3 months can do so by giving a bond for double the estimated duties, based on appraisement, which bond must be guaranteed by two Canadian citizens who are approved in turn by the local collector of customs. A cash deposit of $25 is returned upon exportation of the car.

There is an easier way still, brought about by the foresight of customs brokers who have arranged with the Canadian government so they are able to furnish the requisite bond and the customs touring permit for a fee of $5, no cash deposits being required. This permit can be mailed to the home of the intending tourist and is good for crossing into Canada at any point on the frontier without formality.

Massachusetts seeks to greatly increase the registration fees

It also will be found that at the present time there is an almost universal agitation against the use of the muffler cutout, and most of the leading cities have enacted legislation forbidding the practice. Because of this tourists will have to be careful in the large municipalities and keep the foot off the cutout-pedal. Even if the noise is permissible it will be found that it is best to take no chances in strange territory.

As to Warning Signals

Along this same line, it will be found that there has been a general amending of city ordinances regarding warning signals. There is a tendency to frown down on unnecessary noise, but it has been discovered there is need of a warning that will accomplish its purpose, so the latest angle of municipal legislation is to order cars to be equipped with "an adequate warning signal which should produce an abrupt sound sufficiently loud to be heard under all conditions of traffic, and that its use, save as a warning signal, should be prohibited." In some states, too, there are rigid laws as to the blowing of horns at turns and particularly in the east is it necessary to become posted on these points, for often arrest follows a failure to give the proper notice of an approach to a turn or a crossing.

"Who keeps or uses motor cars of any description for hire or rent shall obtain from the sheriff a license for the transaction of such business"

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Digest of American Motor Laws

Alabama—Register with the secretary of state; fees, $7.50 up, according to horsepower. Resident county, fees 25 cents.
Only rear number plate required.
Non-residents exempt under reciprocity clause.

Arizona—Motorists are not required to register in the territory.
Chauffeurs are not required to take out a license.
Speed limit is regulated in communities only.
Regulations as to lights are local also.
Legislation pending.

Arkansas—Register with the secretary of state at Little Rock; fee, $5 annually.
Chauffeur's fee is $1 annually.
Tags are furnished by the secretary of state.
Non-residents are exempt from registering, providing they carry tags of their own states.
Speed limits: 8 miles an hour in towns and cities.
Lights: Two front and red in the rear.

Connecticut—Register with the secretary of state at Hartford. Fees: 50 cents per horsepower under 25; 60 cents 25 and over.
All operators are licensed annually, the fee being $2.
Tags are furnished by the secretary of state.
Non-residents are exempt for 10 days, providing they carry their own state tags.
Speed limits: Reasonable and proper rate, 25 miles an hour for ⅛ mile on a public highway being considered a violation of the law; 10 miles an hour at crossings; 3 miles an hour in passing street cars discharging passengers.
Lights: Two white lights in front; red in rear and white light illuminating license number.

Colorado—Colorado has no law requiring the state registration of motor cars and at the present time the regulation of such vehicles does not come within the jurisdiction of any state department. The registration, licensing and regulating of motor vehicles only is required in cities and towns when local ordinances demand same. In Denver a visiting motorist who stays more than 24 hours must procure a permit from the fire and police board at the city hall at a cost of $1, which is refunded upon departure.

Delaware—Register with the secretary of state at Dover; fee, $5 a year.
Chauffeurs are compelled to take out a license; fee, $5 a year.
The state furnishes the license tags.
Non-residents are exempt, provided reciprocal relations exist with states from which they come.
Speed limits: 20 miles an hour in the open country; 12 miles an hour in town.
Lights: At least one white light in front and a red one in the rear.

District of Columbia—Register with the automobile board; fee, $2.
Chauffeurs must be licensed, but subject to no special requirements.
License tags issued by the secretary of the automobile board upon surrender of the receipt of the collector of taxes, District of Columbia, for such fee.
Non-residents exempt 10 days upon registering name, home and temporary address with automobile board within 24 hours after arriving in District of Columbia.
Speed limits: 12 miles within fire limits; 15 miles in the parks; 8 miles at crossings; 6 miles around corners; 4 miles at intersection of certain streets; 20 miles outside of fire limits, and 12 miles passing vehicles.
Lights: Two suitable lamps, one on either side of vehicle; red light in rear and throwing white light on number plate.

Florida—Register with the secretary of state; fee, $2.
Chauffeurs must register with the secretary of state; fee, $2.
Certificate of registration issued by the secretary of state, which must be carried when driving. Number plate must be displayed.
Non-residents exempt for 30 days on exhibition of certificate of registration in home state.
Speed limits: 4 miles an hour on curves, bridges, intersections and crossings; reasonable and proper speed.
Lights: Two lamps.

Georgia—Register with the secretary of state at Atlanta; fee, $2.
Chauffeurs are not required to register.
The state furnishes the tags.
Speed limits: A reasonable rate of speed is permitted, no limits being named except that at bridges, curves and crossings the car must not exceed 6 miles per hour.
Lights: At least one white light in front and a red light in the rear, illuminating number.
New legislation pending.

Idaho—Idaho has no state law governing motor cars. This is under the jurisdiction of the various cities and towns.
New legislation is pending.

Illinois—Register with the secretary of state at Springfield. Annual fee, 25 horsepower or less, $4; 26 to 35 horsepower, $6; 36 to 50 horsepower, $8; over 50 horsepower, $10; electrics, $5.
Chauffeurs must pay $5 annually and pass examination.
The state furnishes the tags free.
Non-residents are exempt under reciprocity agreement.
Speed limits: Reasonable and proper, having regard to traffic conditions, and following rates of speed fixed as unreasonable: over 10 miles per hour in business portions of any incorporated city or town; over 15 miles per hour in residence section; over 20 miles per hour outside closely built-up section within corporate limits, and over 25 miles per hour when outside corporate limits.

Indiana—Register with the secretary of state at Indianapolis; fee, $1, which is perpetual.
Chauffeurs are not required to take out a license.
Owners furnish their own tags.
Non-residents are exempt from registration under reciprocity agreement.
Speed limits: 8 miles an hour in business sections; 15 miles elsewhere in city limits; 20 miles an hour in the country.
Indiana recently amended its state law so that municipalities may require registration or license fees.

Iowa—Register with the secretary of state at Des Moines. Fee, 20 horsepower or less, $8; all over 20 horsepower at the rate of 40 cents per horsepower.
No license is required for chauffeurs.
Owners must furnish their own tags.
Non-residents are exempt.
Speed limits: Reasonable and prudent and not more than 25 miles an hour.

Kansas—There is no state law in Kansas as to registration. The speed limit is fixed at 20 miles an hour outside thickly settled sections of cities and towns and at 10 miles within the business section. Each car is required to carry one or more white lights at night. There is legislation pending.

Kentucky—Register with the secretary of state at Frankfort. Fee, $5 for cars less than 25 horsepower; $10 from 25 to 50 and $20 over 50; annual.
No provision is made for individual registration.
Non-residents are exempt under reciprocal conditions.
Owners must furnish their own tags.
Speed limits: Reasonable; 20 miles an hour in the country; 15 miles in residence districts and 10 miles in business sections.
Lights: Two white lamps in front, showing numbers, and a red light in the rear.

Louisiana—There is no state law in Louisiana, motoring being regulated by municipal ordinances. Legislation is pending, however.

Minnesota—Register with the secretary of state at St. Paul; fee, $1.50 a year. Under the new law tags are issued for a term of 3 years. The tags issued January 1, 1912, are good until January 7, 1915.
Chauffeurs must take out a license. The first registration fee is $2 and the annual reregistration fee is $1.
The secretary of state furnishes the tags, for which a charge of $1.50 is made.
A non-resident license is a courtesy tag in Minneasota for 60 days.
Speed limits: Left largely to local ordinances.
Lights: Head and tail lights must be carried.

Massachusetts—Application for registration must be made with the Massachusetts highway commission at Boston. The annual fee is based on horsepower, as follows: Less than 20 horsepower, $5; 20 to 30, $10; 30 to 40, $15; 40 to 50, $20; 50 or more, $25. Legislation is pending which may increase these fees.
Chauffeurs are required to pay an annual fee of $4, which includes the examination by the commission.
Number plates are furnished free with the certificate of registration.
Non-residents who have complied with the motor vehicle law of the states in which they reside may operate in Massachusetts for not exceeding 10 days in any calendar year without registration.
Speed limits: 20 miles an hour outside the business districts; 15 miles in the business districts and 8 miles an hour at crossings.
Lights: Two white lights; one red light in rear and rear number plate illuminated.

Montana—There is no state law in Montana, motor car operation being controlled by municipal ordinances.

Maine—Register with the secretary of state at Augusta. Fee, 20 horsepower and under, $5; 20 to 25, $10; over 35, $15.
Chauffeurs are required to take out a license, the fee for which is $2.
Tags are furnished by the secretary of state, the express being paid by the motorist.
Non-residents are exempt. Non-residents may have the run of the state for 30 days, but it is not specified this must be in any calendar year.
Operators must register and none under 16 can obtain a license.
Speed limits: 15 miles an hour in the open country.
Lights: Two white lamps in front.

Mississippi—Formerly this state had no law, but the new measure provides for registration on a horsepower basis—under 25 horsepower, $5; from 25 to 40, $25. Visitors are allowed 30 days in the state. This law goes into effect June 1.

Missouri—Register with the secretary of state at Jefferson City. Fee, $2 per year for cars less than 12 horsepower; $3 from 12 to 24; $5 from 24 to 36; $7 from 36 to 48; $8 from 48 to 60; $10 from 60 to 72; $12 72 and over.
Chauffeurs must take out a license annually, for which a fee of $1.50 is charged, the age limit being 18 years.
The state furnishes the license tags.
Non-residents are allowed 20 days in the state on a reciprocal basis.
Speed limits: Speed in excess of 25 miles an hour for ½ mile shall be considered presumptive evidence of driving at a rate of speed which is not careful and prudent.
Lights: Two lights in front and a red one in the rear, which must be lighted ½ nour before sunset and burn to within ½ hour of sunrise.

Maryland—Register with the commissioner of motor vehicles at Baltimore. Fee, $6 per year for cars 20 horsepower or less; $12 between 20 and 40, and $18 over 40.
Owners and chauffeurs must take out driving licenses, for which $2 per year is charged.
Tags are furnished by the state.
Non-residents have to apply to the commissioner of motor vehicles for non-resident's 7-day permit tags. Two of these can be had each year, for which no charge is made. The governor also has issued special proclamations allowing residents of New York, Pennsylvania, Delaware, Virginia and West Virginia to use Maryland highways without obtaining any license or tag other than the one issued by their own states.
Speed limits: Not over 12 miles in business districts; 18 miles in residence sections and 25 miles elsewhere.
Lights: Two white lights in front and a red and white in the rear, which shall show registration number.

Michigan—Register with the secretary of state at Lansing; fee, $3; after August 1 in any year, $1.50.
Chauffeurs must register; fee, $2 annually; age limit, 18 years.
The state furnishes the license tags.
Non-residents, including chauffeurs, are exempt on a reciprocity basis.
Speed limits: 10 miles an hour in business districts; 15 miles in residence sections and 25 miles an hour elsewhere.
Lights: Two lights in front with red one in rear, from which white light must illuminate number tag.

Nebraska.—Register with the secretary of state at Lincoln; fee, $2 per year.

As They Affect the Tourist

No provision is made for individual operating licenses.
Owner must provide his own tags.
Non-residents are exempt if they have their own state tags.
Speed limits: 10 miles an hour in business section; 15 miles in residence district; 20 miles elsewhere.
Lights: One or more white lights in front and a red light in the rear.

New Hampshire—Register annually with the secretary of state at Concord; fees, $10.
Chauffeurs required to register annually; fee, $5.
Number plates supplied by state.
Non-residents are exempt for 10 consecutive days if home state laws are complied with.
Speed limits: 10 miles in built-up sections; 25 miles elsewhere.
Lights: Two white lights in front with numbers; one red rear.

New Mexico—At the present time New Mexico has no state law, the operation of motor cars being regulated by local ordinances. Practically all of the cities and towns in the territory have ordinances prescribing the speed limits and the licensing of operators. Legislation is pending.

New Jersey—Register with the commissioner of motor vehicles at Trenton. Fees for registration: $4.50 for cars below 11 horsepower; $7.50 for 11 to 29, inclusive; $15 for cars above 30 horsepower.
All persons desiring to drive a car must procure a driver's license, the fee for which is $2 to drive cars of the first class, which includes those of 30 horsepower and under; and $4 to drive cars of second class—over 30 horsepower.
The state furnishes the license tags.
Non-residents are exempt under a reciprocity agreement for 15 days in each calendar year, divided any way to suit the wishes of the owner. In case a smaller privilege is allowed to New Jersey residents in a certain state, the limits established by the laws of that state shall govern its citizens while in New Jersey. The same provisions apply to chauffeurs.
Speed limits: 8 miles an hour at crossings, 15 miles at crossings in the country; 12 miles an hour in business sections; 15 miles within 200 feet of a horse or other beast of burden; 25 miles an hour elsewhere.
Lights: Two white lights in front and a red one in the rear.

North Carolina—Register with the secretary of state at Raleigh; fee, $5; re-registration, $1 annually. Of the original fee $3 is paid to the county in which the owner resides, to be spent upon roads.
No provision is made for the licensing of operators.
Owners furnish their own tags.
Non-residents are exempt.
Speed limits: 8 miles an hour in business sections, 12 miles an hour in residence sections and 25 miles an hour elsewhere.
Lights: Two white lights in front and a red one in the rear.

New York—Register with the secretary of state at Albany. Annual fee, $5 for 25 horsepower or less; $10 from 25 to 35; $15 from 35 to 50; $25 for over 50. Fees are in lieu of taxes.
Chauffeurs are required to secure an operating license, for which a fee of $5 annually is charged. Examination of applicants is held at convenient places throughout the state. Non-resident chauffeurs are exempt.
Tags are furnished free of charge by the secretary of state.
New York state grants reciprocity.
Speed limits: "Every person operating a motor vehicle on the public highway of this state shall drive the same in a careful and prudent manner and at a rate of speed so as not to endanger the property of another or the life or limb of any person; provided, that a rate of speed in excess of 30 miles an hour for a distance of ¼ mile shall be presumptive evidence of driving at a rate of speed which is not careful and prudent." Local ordinances are prohibited.
Lights: Two white lights in front and a red one in the rear; rays of rear light to illuminate the number tag.

North Dakota—Register with the secretary of state at Bismarck; fee, $3 annually.
Chauffeurs are not required to secure a license.
License tags are furnished by the state.
Non-residents are exempt.
Speed limits: 10 miles an hour in incorporated cities and villages; 30 miles an hour elsewhere.
Lights: Two white lights in front. The new law permits of the number being painted on the lamps in lieu of tags.

Nevada—The only law on Nevada's books pertaining to motor cars has to do with those operated for hire. A license fee of $2.50 a month is charged for such vehicle, the fee to be paid to the sheriff of the county in which the machine is operated.

Ohio—Register annually with the secretary of state at Columbus; fee, $5 for steam and gasoline cars; $3 for electrics.
Chauffeurs are required to take out a license, the fee for which is $2.
The state provides the number plates.
Non-residents are not required to register.
Speed limits: 8 miles an hour in the business and closely built-up portions of municipalities; 15 miles in residence districts and 20 miles outside of any municipality.
Lights: Three white lights, two on the front and one on the rear, the rays of the rear lamp illuminating the number plate.

Oklahoma—Oklahoma has no state law.

Oregon—Register annually with the secretary of state at Salem. Fees: Gasoline and steam cars—up to 26 horsepower, $3; from 26 to 36, $5; from 36 to 40, $7.50; in excess of 40, $10. Pleasure electrics—$3; electric service vehicles, $5.
Chauffeurs must secure an annual license, the fee for which is $2.
The state furnishes the license tags.
Non-residents are exempt for 30 days, provided they carry their own state tags.
Speed limits: "The rate of speed on all streets, roads and highways of this state shall be a reasonable speed, up to and not exceeding 25 miles an hour."
Lights: Two white lights in front and one red light in rear, the rays from the rear light to illuminate the number plate.

Pennsylvania—Register annually with the state highway department at Harrisburg. Fees: Up to 20 horspower, $5; from 20 to 50, $10; 50 or over, $15.
Chauffeurs or paid drivers must secure a driver's license; fee, $2.
The state provides number plates.
Non-residents are exempt but must display home state tags.
Speed limits: 1 mile in 2½ minutes.
Lights: Two white lights visible not less than 200 feet in direction car is proceeding.

Rhode Island—Register annually with the motor car department of the state board of public roads at Providence. Fees: Up to 20 horsepower, $5; 20 to 30 horsepower, $10; 30 to 40 horsepower, $15; over 40, $25.
All persons operating a motor car are known as operators and must secure an operator's license, the fee for which is $1.
Number plates provided by the state.
Non-residents exempt if registered in home state.
Speed limits: 15 miles in the business and closely built-up sections; 25 miles outside of the built-up portions of any municipality.
Lights: One or more lights in front and capable of throwing a light 200 feet in the direction in which the car is traveling. One rear light, showing red in the rear and white on the side illuminating the number plate on the rear of the car.

South Dakota—Register with the secretary of state; fee, $1, which is perpetual.
Chauffeurs not required to register.
State furnishes number plates.
Non-residents exempt if own state tag is displayed.
Speed limits: 10 miles in city limits; 10 miles outside such limits.
Lights: Front and rear lights required.

South Carolina—Register with the county clerks of the various counties; fees, no provision.
Chauffeurs not required to license.
No state provision for number plates.
Non-residents are exempt as regards state law.
Lights: One white front light; one red rear.

Texas—No state law. Registrations are made with the county clerk of the county in which the owner resides.

Tennessee—No state registration required.
No chauffeur's license required.
State furnishes certificates of registration only; owners must furnish number plates.
Non-residents not exempt.
Speed limits: 20 miles per hour. Any municipality has the power to prescribe a lower rate of speed for its corporate limits.
Lights: None required.

Utah—Register with the secretary of state at Salt Lake City; fee, $2.
Chauffeurs required to take out a license, the fee for which is $2.
Number plates furnished by the state.
Non-residents exempt.
Speed limits: 10 miles an hour in the business and closely built-up sections of an incorporated city or town; 15 miles an hour in an incorporated town or city, and outside of a municipality, 20 miles an hour.
Lights: Two white lights in front and a red light in rear.

Vermont—Register annually with the secretary of state at Essex Junction; special provision made for cars registered in previous years. Fees: First registration, $1 per horsepower; second registration, 75 cents per horsepower; third and successive registrations, 50 cents per horsepower.
Chauffeurs required to register annually; fee, $2. Owners must register also.
Number plates furnished by the secretary of state.
Non-residents exempt if registered in and home state grants reciprocity. A reciprocity clause grants exemption to non-residents, who also can register for 3 months at one-fourth the regular fee.
Speed limits: Ordinary discretion and caution to be used and must have perfect control of car and to make use of proper signaling devices.
Lights: Two lights in front, which must be visible for 200 feet; one red light in rear, which must illumine the number plate.

Virginia—Register annually with the secretary of the commonwealth at Richmond. Fee: Up to 20 horsepower, $5; 20 to 45 horsepower, $10; 45 horsepower and over, $20.
Chauffeur's registration fee, $2.50.
State provides number plates, also badge for chauffeur.
Non-residents displaying own state license tag exempt for two periods of 7 consecutive days, if own state extends reciprocity to Virginians.
Speed limits: 8 miles an hour in built-up portions of city, town or village; 8 miles an hour where view of road is obstructed and when passing vehicles; 8 miles an hour at intersection of roads; 20 miles an hour elsewhere.
Lights: One white light in front throwing rays of light 100 feet in the direction the machine is going; one red light in rear.

Wisconsin—Register with the secretary of state at Madison; fee, $2.
No provision made for the registration of chauffeurs.
Number plates furnished by the state.
Non-residents exempt, but required to display home license.
Speed limits: 12 miles within the corporate limits of city or town; 25 miles an hour elsewhere.
Lights: One white light in front.

Washington—Register with the secretary of state at Olympia; fees, annual, $2.
No driver's license required.
Number plates supplied by owners. Rear only.
Non-residents exempt.
Lights: One or more white lights in front, with numbers; one red rear.

Wyoming—No state laws, but legislation is pending.

West Virginia—Register annually with the auditor of the state at Charleston; fee, $10.
Chauffeurs must register; fee, $2.
State auditor furnishes number plates.
Non-residents exempt.
Speed limits: 10 miles an hour in closely built-up portions of a municipality; 15 miles an hour in less congested sections of a city; 20 miles an hour elsewhere.
Lights: Two white lights in front, one red light in rear.

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As Detroit Views the Retail Outlook

Mississippi Floods Have Greatly Retarded Trade in That Section—In Northern and Southern Parts of Central West Crop Reports Make Manufacturers Optimistic—Dealers Well Stocked

DETROIT, Mich., April 13—The advent of warm weather has started the retail selling season in earnest, according to advices received by all the factories. As usual, this symptom is felt first in the larger cities. The smaller towns and the country districts are slow in starting this year, due to the late spring and the presence of an unusual amount of water in the roads. The floods in the Mississippi valley region have practically put this part of the country out of it for the present, trade reports and dealers' testimony through the territory all agreeing that the demand for cars will be practically nothing for a couple of months. Some reports have it that the damage done to crops in this region will make it a poor market for at least a year.

Exactly opposite conditions prevail, however, in the northern and southern parts of the central west. Here, although the season has not yet opened, crop reports are of the rosiest sort, and the entire region from the Dakotas to Texas is looking forward to a most prosperous year.

In general, dealers are well stocked up through this region. Spring production has been greater than ever before and the scarcity of cars, usually so characteristic a feature of May, promises to be less stringent this year. Of interest if the announcement of the General Motors Co. which states that the various factories of this group have shipped out through February and March a total of $9,000,000 worth of cars. Daily receipts of orders have been, according to the statement, $10,000 ahead of last year, on an average.

FREIGHT CAR FAMINE

Detroit, Mich., April 15—All the manufacturers have been interested in the effort which the commercial bodies of Detroit and Philadelphia are making to foster a trade alliance between these cities, by securing for Detroit a direct line of the Pennsylvania Railroad. The Pennsylvania system's nearest connection at present is at Toledo. It is urged here that an extension of the Pennsylvania to Detroit would go far to obviate a repetition of the car shortage which, to a certain extent, is still in evidence. The Philadelphia business men see in such a connection an immense commercial advantage.

To secure terminal facilities for the Pennsylvania here would be, it is certain, a feat of considerable difficulty. The approaches to Detroit are all well guarded at present, and the New York Central system is in control of practically all the sidings used by the Detroit manufacturers. The attitude of this road has not been made clear as yet but it is believed that it would give the Pennsylvania no great encouragement, provided it should see fit to make the trial.

CHARGES ATLAS WITH CONTEMPT

New York, April 15—Contempt proceedings have been commenced against the Atlas Chain Company by the Wood Tire Chain Grip Co., alleging violation of the injunction laid against the Atlas company in selling chains prohibited by the decree. The writ is returnable April 26 before Judge Lacombe in the United States district court for the southern district of New York, and commands the Atlas company to show cause why it should not be adjudged in contempt of court.

GIVES UP BIG SHOW IDEA

Chicago, April 16—The Chicago Automobile Trade Association, at its general meeting today, decided to withdraw its application for a sanction, made to the National Association of Automobile Manufacturers, to hold a truck show in the Coliseum this fall, and instead devote all its efforts to promoting its second annual fall opening, taking in the entire local trade. This will be held some week between the middle of September and middle of October.

PROMINENT TIRE MAN DIES

Youngstown, O., April 13—L. J. Lomasney, vice-president and general sales manager of the Republic Rubber Co., after a lingering illness which caused his retirement from active connection with the company, died at his home here last Tuesday night, the funeral taking place yesterday. Mr. Lomasney's death makes John H. Kelly general sales manager instead of acting general sales manager.

ELECTRIC SELF-STARTER TRIED OUT

New York, April 16—At the headquarters of the United States Motor Co., a demonstration of the new Hartford electric self-starter was given Monday. The novel point of the self-starter is the 4½-pound flywheel, in which the energy of the small motor is stored up while the motor is traveling at its normal rate of 7,000 revolutions per minute. The motor is geared down so that the driveshaft of the car turns over seventy times per minute at this motor speed, giving a reduction of 100 to 1, the electric starter motor being geared to the driveshaft just behind the clutch. The motor develops ⅓ horsepower and is operated by a 16-volt storage battery.

At the test in front of the United States Motor Co.'s building, in which the starter was fitted to a six-cylinder car, the motor drew about 11 amperes at a voltage of 18. In using the starter the operator touches the contact-maker with his foot, setting the starter in motion. He then slowly lets in his clutch, the male member of which is moving at the rate of seventy revolutions per minute, owing to the effort of the small motor. The engine is turned over until it starts. As soon as this occurs an automatic clutch throws the motor out of engagement with the driveshaft of the car. About fifty attended the demonstration and luncheon which followed.

ZUST BANKRUPTCY WOUND UP

New York, April 17—Special telegram—The bankruptcy of the Zust Motor Co. was finally wound up this week when an order was issued from the United States district court confirming the composition on a basis of 15 per cent. Distribution to the creditors will be made in the near future. The proved claims amounted to $37,000 and the amount to be distributed is $5,350. Plans for reorganization are under way.

DETROIT ABANDONS SHOW IDEA

Detroit, Mich., April 15—William E. Metzger and Roy D. Chapin have returned from New York where they went to investigate the practicability of securing recognition of an official character for the proposed national show here in August. They found that a sanction would be difficult to secure and, on their advice, the project has been dropped. Mr. Metzger proposes to substitute a national truck show and is now looking the ground over, with a view to finding if the proposition meets with favor from other manufacturers.

SOLID TIRE SUIT DECIDED

Chicago, April 12—Decision was rendered yesterday in the patent litigation on solid rubber tires as applied to buggies, but which is held not to affect motor tires. Suits were brought against the B. F. Goodrich Co. and the Republic Rubber Co. for infringement of the Grant patents held by the Consolidated Rubber Tire Co. and the Rubber Tire Wheel Co. Judge Kohlsaat, of the United States district court, rendered a decision for the defendants, based on the failure of the plaintiffs to prove title to the patent and that the acts of the defendants in selling merely the rubber tire portion and not the wheel, which is the substance of the Grant patent, did not constitute an infringement. According to S. E. Hibben, attorney for the Goodrich people, the victory is important in that it was achieved in the face of the fact that the patent had been sustained by the supreme court of the

Molders' Strike Affects the Industry

United States in a suit against the Diamond company, and because of the large accounting for profits and damages that otherwise would have had to be rendered to the owners of the Grant patent.

STATUS OF CAMERON CASE

New York, April 13—Reporting adversely to the proposed composition of the debts of the Cameron Car Co. of Beverly, Mass., the representative of Herman Steinberg, attorney for many of the creditors of the embarrassed concern, states that the matter of accepting the composition on a basis of 10 per cent stands as heretofore and that the matter is now before the United States court at Salem for confirmation. He reports that the assets of the company at Beverly amount to $60,041, and that in addition there is the factory at Attica which cost $25,000 and against which there is no mortgage indebtedness. Since the failure, the receiver has assembled and finished several cars. The mortgages total $42,000. There are preferences that may amount to $8,000, depending on the action of the court. Mr. Steinberg says that he feels confident that a dividend in excess of the 10 per cent to be had by accepting composition can be had by administering the estate as an ordinary bankruptcy. Objections have been filed on behalf of the Pittsburg Steel Specialties Co. and other creditors.

HORN-MAKERS' APPEAL ALLOWED

Buffalo, N. Y., April 16—Judge Hazel, in the federal court, has issued an order allowing the appeal of the Lovell-McConnell Mfg. Co., of Newark, N. J., the Hutchinson Electric Horn Co., of Ossining, N. J., and Miller R. Hutchinson, of East Orange, N. J., in the action brought against the International Automobile League of Buffalo to restrain the latter concern from infringing on a patented horn made by the plaintiffs.

The complaint against the International Automobile League was filed some years ago. It alleged that the defendant bought patented motor horns made by the plaintiff and labeled and sold them for less than the price fixed by the holder of the patent. With each horn were instructions to dealers stating that the horn must be sold in the original package and must be sold for a certain amount. The case will be heard next month in the circuit court of appeals, New York city.

SPEEDOMETER SUIT PRESENTATION

New York, April 15—In the presentation of the suit of the Warner Instrument Co. against the Stewart & Clark Mfg. Co. for alleged infringement of patents held by the complainant, the arguments of both sides were centered largely in outlining the functions of the permanent magnet. This took 2 days' time in the United States district court.

Aluminum and Brass Workers Threaten to Slow Production in Detroit—Fight Is Over Wages and Supply of Parts Is Almost Depleted—Situation as Reported from Syracuse—Trouble at Buffalo Also

DETROIT, Mich., April 15—Rapidity of production at the Detroit factories is being threatened somewhat by a strike of aluminum and brass molders and foundrymen. There are several specialists in this branch of manufacture who supply all but two or three of the local plants with aluminum and brass castings. These firms have made a strenuous effort to keep up on their orders. Patterns have been shipped to Buffalo, Chicago and other foundry centers, while the local plants have been kept moving to a certain extent by the use of non-union labor.

This condition has prevailed for 2 weeks and the reserve supply of such parts, always kept in hand, is now practically exhausted, leaving the manufacturers dependent on the direct source of supply. The local brass foundries are all picketed and the situation continues unchanged. In several of the foundries the non-union workers are housed and fed under the roof where they are at work.

The point at issue is the recognition of the union, the wage scale being at present, according to the manufacturers, on a higher average than would be the case if the demands of the men were conceded. It is felt, however, that a concession to the demands of the union would create a damaging precedent for the whole industry which, in Detroit, has been almost entirely of the open-shop order. In their stand the aluminum and brass manufacturers have the support of the motor car builders, and there has been no complaint on their effort to win the strike, even if at the expense of a pause in production.

The labor situation in Detroit always has been one of the greatest advantages of the city as a manufacturing center. At present, the supply is almost entirely of the non-union order, the demand for help being always greater than the supply. Wages have been accordingly satisfactory and efforts, made from time to time to unionize the trades have been conspicuous failures, due largely to the fact that the men are satisfied with their present pay. To a great extent the machine shops of the various factories are manned by young men who come from the farms and small villages of Michigan and neighboring states. This class of labor never is partial to organization. To a great extent, however, the brass and aluminum workers are city men. They have maintained a small union for a time ante-dating the motor car industry. The present effort to secure general recognition of the union is the result of the presence in the city of a detachment of professional agitators.

Incidentally, there has been a noteworthy upward trend in the motor car workers' schedule of pay, during the past few weeks. The Ford Motor Co. has voluntarily increased its scale in the factory, 15 per cent, coupling this with a reduction of working hours from 10 to 9. The Studebaker Corporation has made similar increases in several of its departments. At present, an average of 25 cents an hour is a fair one for the motor car workers. This, of course, does not include the large gangs of common laborers employed about the plants, on the shipping platforms and at work on the material trucks. These are mostly foreigners.

ALUMINUM MOLDERS STRIKE

Syracuse, N. Y., April 13—Fifty molders employed by the Aluminum Castings Co. of this city have struck, the action leading to like procedure in ten other plants of the company and now threatening to tie up motor car factories all over the country. The company makes parts used by nearly all the car manufacturers. Announcement received this week of a strike of 300 union employes of the company's three plants in Cleveland occasioned no surprise to the company's union molders here. The trouble is over the minimum wage agreement, and Matthew McGowan, the union's business agent, said that the ordering of a general strike was the only way they could get it.

After calling out the men here, the men in the two Buffalo plants went out. Strikes followed in the company's plants at Detroit—two factories—and one each in New Kensington, Pa., Fairfield, Conn., and Manitowoc, Wis.

Officials of the Iron Molders' Union say that unless the aluminum company sends its patterns to other brass foundries in Syracuse, there will be no sympathetic strike here. This sets at rest the fears of local car manufacturers.

DYER ANSWER DELAYED

New York, April 15—A further postponement of the answer day in the four main suits of the Enterprise Automobile Co. against Winton, Maxwell, Locomobile and Saurer in the matter of the Dyer patent suit has been secured. It was to have come up today. Now it looks as if the matter will be carried over to fall. The Enterprise company has started suit against the importers of the Darracq and a couple of owners.

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Touring Made Easy

ON OTHER pages of this issue Motor Age draws attention to the present progress that is being made to simplify touring throughout the different states of the union. One of the biggest handicaps to touring in the past has been the non-resident clause in which certain states made it imperative for non-residents to take out special licenses before they were allowed to enter the confines of their state. New Jersey was one of the major offenders in this respect, but within the past month she has opened her gates on the reciprocity-clause basis, so that now a citizen motorist of any state that offers non-resident touring privileges to the citizen of New Jersey can enjoy similar privileges when he uses the Jersey roads. There are at present nearly two-score states that treat non-resident motorists on the reciprocity basis and against this are but three which hold out against non-residents and require them to take out special licenses. Of these three one is at least trying to have its statutes amended in this respect, so that soon it will be said to the credit of the various state legislatures that they have realized the interstate nature of the motor car, and they now look upon it as a vehicle of country-wide utility instead of having its field of activity restricted to the boundaries of a state.

NOW that the bars have been practically completely broken down in the matter of reciprocal non-resident privileges it is but a natural step for states to get together on the matter of uniform regulations on such questions as speed laws, regulations governing the carrying of lights and regulations on all forms of signals, etc., etc. It is today a hardship on a tourist to have to obey different arbitrary speed regulations in the different cities that he may pass through in a day's travel. If it is legal to travel at 20 miles per hour on the open road in one state there is not any rational reason why he should not be permitted to travel at a similar speed in an adjoining state unless in sections where road conditions would render such a speed dangerous to the passengers and other road users. There are places where mountain roads are specially dangerous, also where tortuous roads are equally dangerous and in such instances special legislation in so far as speed is concerned are needed, but there should be due warning given by adequate roadside signs.

IN THE question of signals to be used, in the matter of muffler cutouts and in the question of lamp equipment uniform legislation should be aimed at. In one city one form of signal is required, in an adjoining city a different form is stipulated, so that it is necessary in certain sections of the country to carry at least three different kinds of warning signals if the driver is to obey the signal laws in the different places passed through in a day's tour. This question should be corrected. It is hardship to the motorists and is an antiquated restriction on a modern industry. The question of the muffler cutout is not generally settled in the minds of different communities as yet, but the solution is already in sight. In the big city it is a consumer of mental and physical energy and as such is doomed to an early elimination. Two big cities, Chicago and New York, have already set the pace and at present many cities of populations ranging over 200,000 have enacted anti-cutout legislation. In country districts the inhabitant of the village along the main highway objects to the needless noise created by the tourist at night and he today is working against the cutout. The majority of the car makers are in favor of greater quietness in the operation of motor vehicles and so are heartily in accord with all legislation pointed in that direction. The time is not far distant when the use of the cutout will not be a matter of concern to the tourist who expects to drive his car through half a dozen different states on a 3 weeks' vacation tour.

THE problem of uniform lamp and headlight legislation is coming to the front. The fact that New York has legislated against the use of headlights within the city limits has set the legislators in other cities on the path of investigation and it looks today as if there will be much varying legislation on this question. This must be guarded against. The car makers should give this matter their attention. Already much individual legislation has been attempted in different states by private parties who have wanted to get laws on the statute books, stipulating the use of their own devices for lighting purposes. In two or three states bold attempts have been made by individuals to get certain forms of combination tail lamps and illumined license numbers legislated into the statutes. Were some of such measures enacted into law it would mean that only their particular lamp could be used in their state. Were half a dozen different states to get varying regulations on their statute books, the trouble to the tourist would soon be as great as the non-resident regulations were a few years ago. Injuries to uniform laws must be guarded against. The question of uniform lights goes even further in that Illinois has a clause in its present law that the switch controlling the electric tail light must be located outside of the car body. The object of the legislation was good in that it aimed at preventing a reckless driver turning out the light in case of accident and thereby making his escape so much the easier. The object is commendable, but the possible ramifications of such legislation are endless. It means that if different states carried out their local conceptions as to the location of such switches that the car maker would have a different equipment for each of the different states. This would be an unreasonable hardship. Makers should give this matter their attention and lend their influence to the lawmakers in the cause of rational and uniform regulations in different states governing the questions of lamps and lamp controls.

THERE is one great essential in which uniform state regulations are needed and that is in the matter of the rules governing the use of the roads, the question of roadside signs and hand signals used by car and horse drivers. These fields of new legislation are the cause of many accidents every year. The absence of roadside signs giving adequate warning of dangerous railroad crossings, bridges or cross roads is a want at the present time. Not only are such signs needed, but it is imperative that they be of uniform design. Such signs must be brief and graphic. Long-worded signs are next to useless. The tourist will not slow up to read them.

More Changes in Tire Prices Noted

NEW YORK, April 15—Since the announcements made last week by the tire concerns there have been more changes made in prices, involving Diamond, Firestone and Republic. Diamond had announced one reduction of a 10 per cent drop, but this has been amended to a 15 per cent reduction in the consumers' list and a shade less than 5 per cent in dealers' prices, which brings the list to about the same as Goodrich's.

Both consumers and dealers figure largely in the Firestone drop, which places that concern between the United States Tire Co. and Fisk. A 34 by 4-inch Firestone now is listed to the consumer at $32.85; the Goodrich and Diamond ask $31.60 for the same size, while Fisk and the United States get $33.10. Firestone has lowered the dealers' list to about 5 per cent over that of the Goodrich.

The Republic reduction is 10 per cent on most of its casings and tubes to the users, which makes a 34 by 4 list at $34.20.

"The recent price disturbance, started by our competitors, has made necessary a general revision of list prices, owing to the fact that discounts had complicated prevailing prices to such an extent that the dealers were becoming confused thereby," says an official of the Diamond company. "In revising prices we have taken into consideration the fact that the dealer can not do a sufficient volume of business with too great a discrepancy between prices on Diamond tires and prices generally quoted for tires of other popular brands."

"In studying over this situation we arrived at the required move, which is not a mere reduction of ordinary nature, but one that would mean a check to the whole downward course of tire prices through the competitive methods of price-cutting," is the Goodrich explanation.

"We can see no particular reason for such a reduction, other than that it is exceptional that any dealers sold at consumers' prices; that consumers' price lists were simply figures from which certain discounts were allowed. As far as the cost of crude materials is concerned, the reduction is unwarranted," says the Swinehart company.

An advance in the prices on the smaller sizes of nobby treads and staggard treads is announced by the United States and Republic companies.

GOODYEAR CUTS BIG MELON

Akron, O., April 12.—Directors of the Goodyear Tire and Rubber Co. have announced that all preferred stock is to be retired at 150. The company declared a common stock dividend of 100 per cent out of its net earnings and increased the capital stock from $6,000,000 to $15,000,000, $10,000,000 of common stock and $5,000,000 of preferred.

Diamond Amends Last Week's Announcement—Firestone and Republic Last

NEW TIRE PRICES

Herewith are new consumers' prices on plain tread casings, the Goodrich under date of April 1, the United States April 5 and Fisk, April 10.

Size	Goodrich	United States	Fisk
30x3	$13.50	$13.85	.....
30x3½	19.85	20.35	$20.35
30x4	27.20	29.20	29.20
32x3	14.40	14.80	.....
32x3½	21.20	21.70	21.70
32x4	29.25	31.40	31.40
32x4½	37.30	40.05	40.05
34x3	15.25	.....	.....
34x3½	23.05	23.65	23.65
34x4	31.30	33.60	33.60
34x4½	39.65	42.60	42.60
34x5	48.85	52.45	52.45
36x3	16.25	.....	.....
36x3½	24.95	25.60	25.60
36x4	33.35	35.80	35.80
36x4½	42.05	45.20	45.20
36x5	51.65	55.50	55.50
36x5½	60.25	64.75	64.75
38x4	35.35	.....	.....
38x4½	44.40	47.75	47.70
38x5½	63.60	68.30	68.30
40x4	37.35	40.10	40.10
40x4½	46.80	50.25	50.25
40x5½	67.15	.....	72.15
42x4	39.45	42.35	.....
42x4½	49.10	52.75	52.75

Coming Motor Events

April 15-20—Track meet; Birmingham, Ala.
April 27—Speedway race; Los Angeles motordrome; Los Angeles, Cal.
April 29-May 4—Annual show Burlington, Vt.; Merchants' Protective Association.
May 4—Hill-climb; Atlanta, Ga.
*May 4—Road Race; Motor Car Dealers' Association; Santa Monica, Cal.
May 12—Track meet; Salt Lake City, Utah.
*May 15-18—Commercial reliability run Chicago Motor Club, Chicago, Ill.
May 18—Sociability run at Washington, D. C.
May 17-18—Track meet; Colorado State Automobile Association; Denver, Colo.
*May 30—Indianapolis speedway, 500-mile race; Indianapolis, Ind.
*May 30—Track meet Rockingham park; Salem, N. H.
June 6—Reliability run; Washington Post.
*June 8—Track meet; Quaker City Motor Club; Narbeth, Pa.
June 15—Track meet; Belmont Motor Club; Narbeth, Pa.
*June 20—Algonquin hill-climb, Chicago Motor Club; Algonquin, Ill.
June—Reliability run; Auto Club of St. Louis, St. Louis, Mo.
June—Hill climb; Maine Automobile Association; Portland, Me.
June 27-29—Summer meeting Society of Automobile Engineers; Detroit, Mich.
July 4-5—Track meet; Taylor Automobile Club; Taylor, Tex.
July 4-6—Beach meet; Old Orchard Automobile Association; Old Orchard, Me.
July—Reliability run; Maine Auto Association.
July—Road race; Riverhead, L. I.
July 4—Track meet; Petersburg, Ind.
July 5-6—Road Race; Montamara Festo Auto Com.; Tacoma, Wash.
July—Reliability run; Cleveland News.
July 10-20—Canadian Industrial Exhibit; A. C. Emmett, manager motor section; Winnipeg, Can.
July 15—Reliability run; Wisconsin State Automobile Association; Milwaukee, Wis.
*August 8-10—Galveston beach meet; Galveston, Tex.
*August 23-24—Road races; Chicago Motor Club; Elgin, Ill.
October 5—Fairmount Park road race; Quaker City Motor Club; Philadelphia, Pa.
*Sanctioned by A. A. A.

DETROIT, Mich., April 15—President Howard E. Coffin of the Manufacturers' Contest Association has inaugurated a movement among the members of the association, tending to the discouragement of unsanctioned race meetings and other competitive events. He has made the subject one for a circular letter in which he urges other manufacturers to join in attempting to dissuade dealers from entering events not formally approved by the American Automobile Association.

Mr. Coffin says that the situation in California is particularly bad at present and asks the members to wire their coast representatives to discourage competition at a proposed outlaw road race at Fresno. A similar communication is said to have gone out from President William E. Metzger, president of the National Association of Automobile Manufacturers.

Several of the local factories having representatives in Fresno have wired them not to take part in the meeting, and it is understood that similar action has been taken by manufacturers to a certain extent, outside this city.

PREPARE FOR A. A. A. TOUR

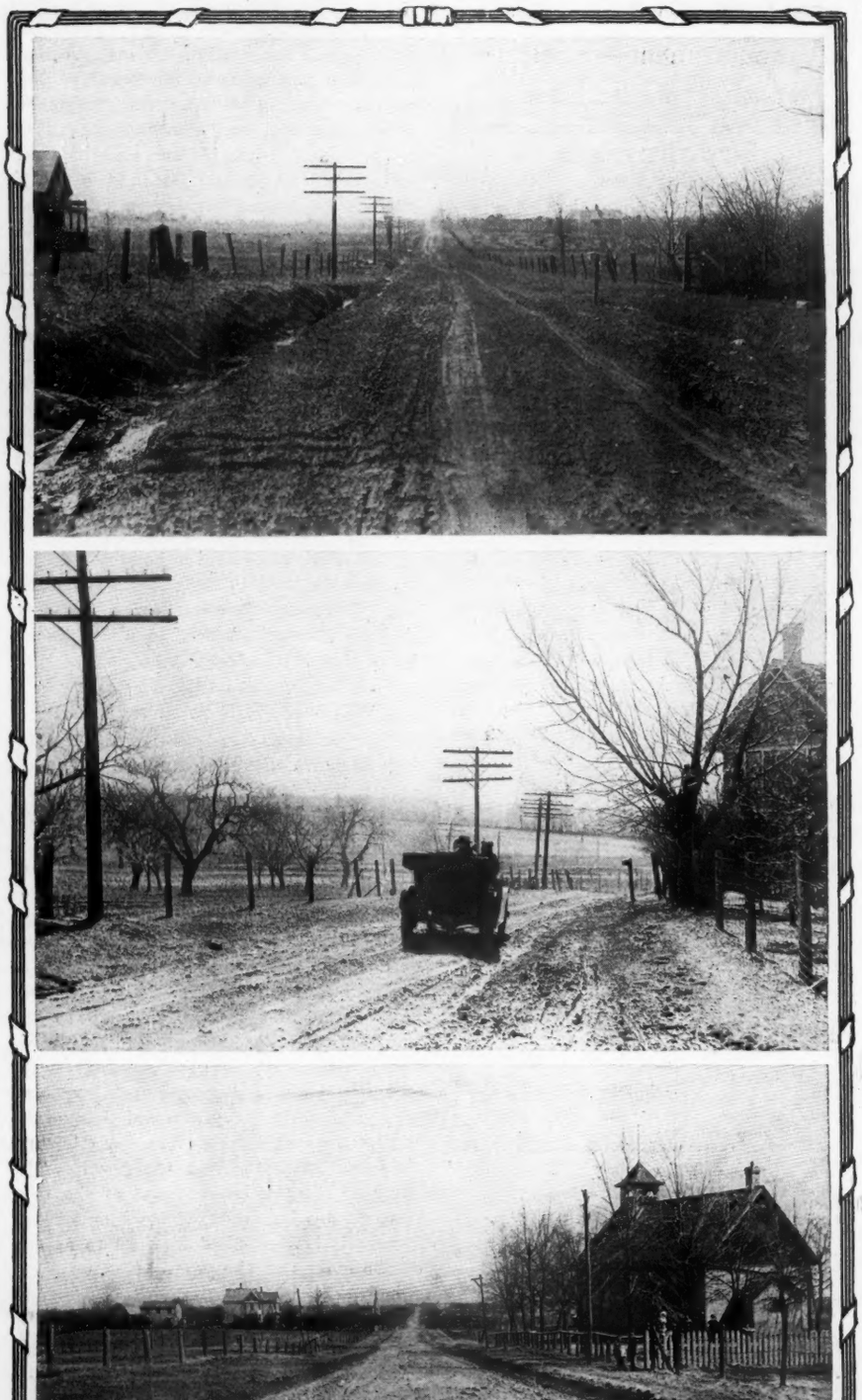
New Orleans, April 15—Efforts are being made to have several New Orleans cars in the A. A. A. reliability tour. Subscriptions are being taken to provide for the expenses of those representing different organizations of this city. The Cotton Exchange, the Progressive Union and the Board of Trade may enter cars. Arrangements have been completed for a party of local motorists to meet the members of the tour at Baton Rouge. This party will extend the first formal welcome to the tourists. At other intermediate points between Baton Rouge and this city other cars will join the line and it is expected that practically every available car in the city will go at least a few miles beyond the city limits to meet the guests. The entry of the regular members of the tour escorted by hundreds of local motor car owners is being looked forward to as one of the events of the year.

DETROIT NOT AFTER TOUR START

Detroit, Mich., April 13—This city has formally abandoned all effort to secure the start of the 1912 national American Automobile Association tour. The project was ignored at the annual meeting of the Detroit Automobile Dealers' Association, which action naturally put it up to the Wolverine Automobile Club. This body, after thoroughly looking over the situation, decided to centralize all its energy on its own club projects.

Lack of effort connected with the start of the tour will enable the Wolverines to centralize endeavors for the success of the tour to the Indianapolis meet May 30.

Milwaukee Starts Its Road Race Boom



MILWAUKEE'S COURSE NO. 1

Top illustration—On road to Kelley's park after making first turn. Proposed grand stand location

Middle—Kelley's park orchard through which a turn will have to be built

Bottom—Janesville plank road just before turning into Hawley road

MILWAUKEE, Wis., April 17—Mayor Bading, just elected, assured 250 motorists and business men who gathered at a noon luncheon at the Plankington yesterday that the city will do everything in its power to assist in the promotion of the Vanderbilt and grand prix road races. At the same meeting Starter Fred J. Wagner, on his way west to the Santa Monica road races, spoke encouragingly of the prospects and afterwards inspected two of the courses under consideration.

While there are six courses under consideration, it is more than likely that No. 1 will be chosen, Starter Wagner declaring his preference for this. This is the Greenfield course in the town of Greenfield, Milwaukee county, and embraces the Janesville plank and Beloit roads, Kelley park road and Hawley road.

It is highly probable that Milwaukee will stage the two classics between September 15 and October 1, and not during October, as first intimated. While no attempt has yet been made to fix dates, the promoters are giving due regard to other important speed events on the motoring calendar during the fall period. Milwaukee does not wish to interfere with the running of the Fairmount Park on October 5 and will not mix up with the Chicago Motor Club's annual reliability on October 7 to 11. The Elgin stock championships will be decided on August 23 and 24, and it is likely that a month will elapse until the Vanderbilt and grand prix are run here.

The latter part of September in southern Wisconsin is one of the finest periods of the year, a glorious early fall, with sta-

Late Trade Happenings

Harry H. Elmer, formerly with the Haynes company, has been made director, vice-president and general manager of the Grant-Lees Machine Co., of Cleveland, O., which makes the Grant six-cylinder.

The Jefferson-DeWitt Co., of Detroit, has acquired the patent trade mark and all rights to the visible spark plug hitherto marketed by the Visible Spark Plug Co.

R. S. Bryant has been appointed consulting engineer of the Standard Welding Co., of Cleveland. Formerly he was with the Bryant Rim Co., of Columbus.

The Vanguard Mfg. Co., of Joliet, Ill., manufacturer of Vanguard windshields, has filed application with Secretary of State James A. Rose, at Springfield, Ill., for an additional $25,000 of capital stock, consisting of 250 shares, par value $100 each. This increase of stock was necessary for the purpose of erecting a new factory building.

A. A. Franklin has resigned his position as advertising manager of the Haynes Auto Co., at Kokomo, Ind., to become identified

Greenfield Course Likely to Be Picked

tionary atmospheric conditions, generally ranging from 55 to 70 degrees above zero. In some past years the latter part of September has actually been hot, with the thermometer reading from 80 to 90 degrees above zero.

E. A. Moross has telegraphed to August A. Jonas, chairman of the M. A. D. A. racing committee, the tentative entry of Bob Burman in each of the two races.

RECORDS FOR DISBROW

San Jose, Cal., April 14—Claim for records is made by Louis Disbrow, who today eclipsed the previous marks of 15, 20 and 25 miles on a circular dirt track at the local driving park. Disbrow drove a 90-horsepower Simplex. His times were: 15 miles, 13:30; 20 miles, 17:57⅘; 25 miles, 22:26⅘. The recognized records, made by Oldfield at Milwaukee in 1910, are 13:41.30, 18:15 and 22:47. The times were made at a track meet run today, which was sanctioned by the A. A. A.

HOOSIERS LAY OUT TOUR ROUTE

Indianapolis, Ind., April 15—At a meeting of the Indiana Automobile Manufacturers' Association plans were completed for the second annual all-Indiana four-states tour. The trip will start from this city on July 9 and will be through Indiana, Ohio, West Virginia and Kentucky, a distance of 1264 miles, returning to this city on the evening of July 24.

SPEEDWAY ENTRIES CLOSE MAY 1

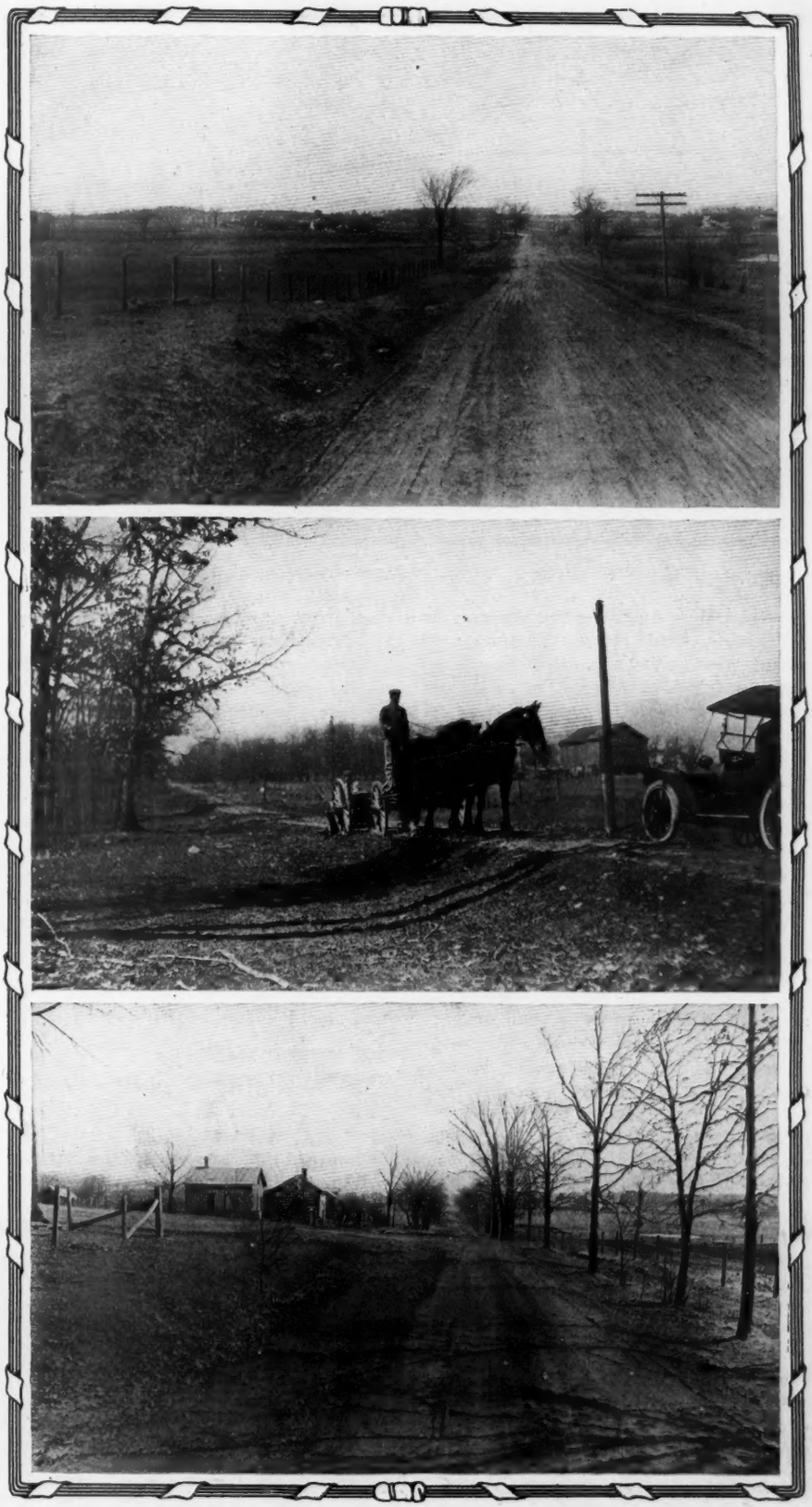
Indianapolis, Ind., April 15—The speedway people call attention to the fact that entries to the 500-mile race close at midnight May 1, and that no nominations will be received after that time.

Changes in Motor Industry

with the Apperson Brothers Automobile Co., of the same city.

The Atlantic Vehicle Co., of Newark, N. J., has announced its line and expects to commence delivery in about 30 days. These electric trucks are being built in four sizes, 1, 2, 3½ and 5 tons. At present the concern is occupying quarters in North Newark, but after the season is ended it is expected that a factory building will be erected on a different location. The chief features of the line will be the even adjustment of weight, 40-inch wheels, single motor drive by silent chain to jackshaft and a gearing that is intended to give about 10 per cent higher speed than has been regarded as standard.

The Nova Scotia Carriage and Motor Car Co., a reincorporated and enlargement of the Nova Scotia Carriage Co., of Amherst, N. S., has been organized with a capitalization of $2,000,000. The company recently commenced the erection of a new building at Amherst and will use the Kentville plant until then.



MILWAUKEE'S COURSE NO. 2

Top illustration—Blue Mound road. Proposed start and finish of course No. 2, which is Milwaukee's second choice
Middle—National avenue highway
Bottom—Long straight stretch on Blue Mound road

Big Truck Run Interests New Yorkers

NEW YORK'S MOTOR TRUCK PARADE—THE BREWERY DIVISION

NEW YORK, April 13—The Motor Truck Club's parade today was a pronounced success, there being more than 500 of the business vehicles in line. The route was from Battery park to One Hundred and Twenty-fifth street, and the trucks made a line nearly 2 miles long. The parade was divided into three divisions and included fifty-three different makes of trucks. The Autocar had forty-four in line, the General Vehicle forty-one, while others prominent were the Alco, Mack, Knox, General Motors, Saurer, Pierce-Arrow, Walter, Mais, Knickerbocker, Packard and Sampson.

Practically 60 per cent of the cars in line were entered by private owners. The route selected was 8 miles long and required 2½ hours to cover. The parade averaged 50 minutes in passing specific points. Most of the trucks paraded for the sake of the parade, but there were probably forty that took part simply as a portion of the day's work. These cars carried loads of merchandise from their warehouses or stores to depots in Harlem and further north.

The general average tonnage of the cars was 2.4 per unit. The gross list price of all the cars was $1,419,000, which takes into account all the trucks that passed the reviewing stand. As the actual count was slightly over 500, the average price figured about $2,800. Fully half the trucks figured as of 3 tons capacity or over.

In the line were seventy-two shaft-driven cars, eight worm drives and the remainder were chain-driven. Left-hand control was not highly represented as only twenty-seven cars were so equipped. Of the gasoline division, thirty-five cars in line had motors in front, the remainder were placed under the drivers' seats.

THE RUBBER MARKET

New York, April 16—Dealings in crude rubber have been on a small scale and the course of the market has been slowly downward the past week. The various Para grades are measurably lower, but the plantation grades have shown more obstinacy in yielding to selling pressure. The current level for up-river Para in New York is $1.16 a pound. Manufacturers are apparently waiting, and most of the sales reported are in small lots for current use.

More Than 500 Commercial Vehicles in Line in Parade —Trade News

WASHINGTON AGENT IN TROUBLE

Washington, D. C., April 17—Special telegram—Alleging that the Pope Automobile Co. is hopelessly insolvent, John H. Nolan, president of the company, has asked the district supreme court to appoint a receiver for the concern and to authorize its dissolution. Mr. Nolan says he owns stock of the company valued at $14,250, more than half the issue. The debts of the corporation are estimated at $18,881.75 and the assets will not exceed $12,137.35. Mr. Nolan tells the court the company is one of the oldest here and is agent for Pope-Hartford, Marathon and Columbus electric.

PANHARD DENIED NEW TRIAL

New York, April 16—The United States district court has denied a motion made on behalf of the Panhard company for a new trial of the suit brought against it by the Interborough News Delivery Co., which resulted in a verdict for the delivery company of about $2,000. The future action in the case depends on whether the French concern decides to carry it to the circuit court of appeals.

W., C. & P. CREDITORS MEET

New York, April 16—Creditors of Wyckoff, Church & Partridge, Inc., have formed, with H. M. Swetland as chairman, a committee for the purpose of bringing the stockholders and creditors of the embarrassed concern into closer touch, so that they may prepare for the resumption of business under reorganization. Reorganization plans are being discussed.

NEW YORK'S TRUCK PARADE—EXHIBIT OF WHEELS AND KNICKERBOCKER IDEA CARRIED OUT

Good Roads Advocates Score in Congress

Underwood Joint Resolution Approved By Rules Committee

WASHINGTON, D. C., April 12—Signal victories were won this week by the good roads advocates who have been endeavoring for years to get congress to take some decisive action regarding national highways. The first victory came when the house rules committee heard representatives of the American Automobile Association and various good roads associations advocate a favorable report on the Underwood joint resolution creating a committee of congress to investigate the building of post roads in the United States. The pleas made were effective enough to prompt the committee to agree to report the resolution, this action being taken immediately following the close of the hearing.

Those who appeared before the committee from the A. A. A. were President R. P. Hooper, George C. Diehl, A. G. Batchelder, and Charles T. Terry. Congressman Henry, chairman of the committee, brought the matter up on the floor of the house the following day, but an objection being raised, the matter went over until next week. As the resolution is fathered by Congressman Underwood, the majority floor leader, it is sure to receive favorable action when it comes to a vote.

The second victory was the favorable report made on the Shackleford bill by the house committee on agriculture. The terms of this bill were given in a recent issue of Motor Age.

NEW YORK TRUCK PARADE—LINED UP AT BOWLING GREEN

CARLSON CASE DELAYED

New York, April 16—Judge Noyes of the United States circuit court of appeals has been succeeded by Judge Ward in the suit of the Carlson Motor and Truck Co. against the Maxwell-Briscoe Motor Co. for an alleged infringement of an engine-cover patent because Judge Noyes declared himself disqualified because he is the owner of a car containing a device such as might be held to be an infringement of the patent of the suit. The case was then reopened. The hearing was repeated in substantially the same form as originally, and the court took the case under advisement. An opinion is expected in a short time.

MILLIONS FOR NEW YORK ROADS

Albany, N. Y., April 16—Referring back to the people of New York the proposed bond issue of $50,000,000 to be used in the construction of improved highways, Governor Dix signed the Murtaugh bill Saturday. The referendum will be presented to the public at the election in November, and if it is adopted, there will be $100,000,000 available for road improvement under the state laws. The appropriation already provided for roads by the state amounts to $50,000,000, the expenditure of which will be spread over several years, according to present plans.

OSWEGO SHOW A SUCCESS

Syracuse, N. Y., April 13—The Oswego show, which closed today, was a success exceeding anticipations. A number of Syracuse agents exhibited. The show opened Wednesday night. Thursday evening a party of Syracuse motorists attended the show and a banquet given by the Oswego club. It was then arranged that the Syracuse and Oswego clubs join forces for the building of a state road between the cities.

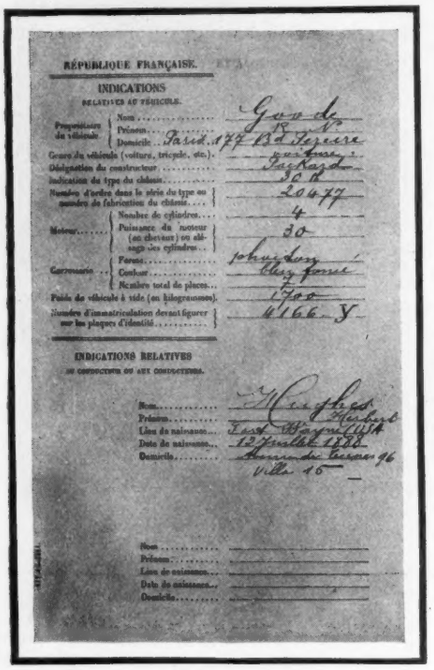
CHECKER HELD RESPONSIBLE

New York, April 15—The municipal court of Brooklyn has decided that an inn-keeper or hotel man who issues storage checks for motor cars to his patrons and then allows some unauthorized person to get away with a car without producing the appropriate check must pay damages to the owner of the abstracted car.

The case in question was that of Dr. A. S. Brinkerhoff of Brooklyn, whose son and a party of friends drove the doctor's car to Coney Island last summer and checked it in the parking space of Feltman's café. When the party wished to return it was found that the car was missing, but was found the next day, damaged.

NEW YORK TRUCK PARADE—A DECORATED TRUCK AND THE TRANSCONTINENTAL SAURER

Routes and Touring Information



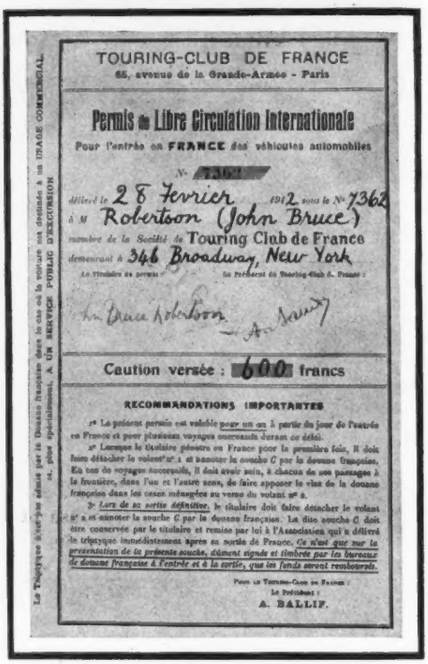
RÉPUBLIQUE FRANÇAISE.

INDICATIONS
RELATIVES AU VÉHICULE.

INDICATIONS RELATIVES
AU CONDUCTEUR OU AUX CONDUCTEURS.

PAGE FROM INTERNATIONAL CAR AND DRIVING LICENSE, SUPPLYING PARTICULARS OF BOTH CAR AND DRIVER

New European Triptyque System—Good Desert Road North of Terrace, Utah Between Kelton and Lucin—Choice Highway Between Pittsburgh and Brownsville, Pa.—Exciting Tour to Half Moon Bay from San Francisco—Gives Advice for Idaho Tourists—Routes Outlined from Tulsa, Okla. to Hannibal, Mo.; Keokuk, Ia. to Grand Forks, N. D.; Clarksville, Tex.; to Clarendon, Tex.; Decatur, Ill. to Rockyford, Colo.; Metamora, Ind. to Argos, Ind.; Wichita, Kans. to Chicago and Traverse City, Mich.; Wichita, Kans. to San Antonio, Tex.



TOURING-CLUB DE FRANCE
65, avenue de la Grande-Armée - Paris

Permis de Libre Circulation Internationale
Pour l'entrée en FRANCE des véhicules automobiles

N° 7362

Délivré le 28 Février 1912 sous le N° 7362
à M Robertson (John Bruce)
membre de la Société du Touring Club de France
demeurant à 346 Broadway, New York

Caution versée : 600 francs

RECOMMANDATIONS IMPORTANTES

FRONT PAGE OF A TRIPTYQUE ISSUED BY THE TOURING CLUB OF FRANCE TO AN AMERICAN MOTORIST

AN important simplification of the present triptyque system has been agreed upon by the European authorities and probably will go into effect during the present year. At the present time a motorist making a tour through Europe must take out a triptyque for each of the countries about to be visited, and obviously must pay over the deposit for each of the documents. For an extended tour this necessitates a provision of money in some cases equal to the value of the car.

Under the new system, agreed to at a recent meeting of the International Association of Automobile Clubs, and now waiting final acceptance from some of the European governments, a customs check book will take the place of the triptyque. On the front page of the book will be inscribed all necessary particulars concerning the car, body, tires, accessories, etc., and each of the inner duplicate pages will be divided into two parts, the top portion recording the departure from any country and the lower half indicating the entrance into another country. These inner pages are for the exclusive use of the customs officers. On the outgoing frontier station the officer records the passage of the car on the upper portion of the page, keeping one copy of this record for himself and leaving the other in the book. On entering the adjoining country, the officer records the arrival of the car on the bottom half of the page and takes the tag for his own records. He will not admit a car into his territory until it has been cleared from an adjoining one, and as this clearance is indicated by the disappearance of the top half of the page and the duplicate stamped sheet left in position, control is practically automatic.

Instead of having to make a deposit for each country visited, the motorist using an international customs book merely pays over an amount equal to the highest duty in any one European country. Thus, if the car is not taken home again the country in which it remains will claim the amount equal to the duty, and this amount will be handed over by the national club having issued the book and received the deposit. It will obviously be easy to trace the passage of the car by the checks left behind at each crossing of the frontier.

One of the greatest defects of the present triptyque system will be avoided under the new plan. It is now an easy matter for a motorist to leave a country without getting his discharge, or with only a temporary discharge. There is no opposition to his departure, and on entering the adjoining country the officer does not ask if he has fulfilled all the formalities with the regard to the country he has just left. In consequence a car is sometimes legally considered to be in two countries at the same time, and although there may be evident proof that it has returned to its own country the customs deposit will not be returned until the outgoing triptyque has been signed. And for this document to be signed the car must sometimes be taken back to the frontier station as palpable proof that it has not been left behind. With the international customs book no car will be admitted until the discharge sheet has been signed. Thus, a French officer would send a car back over the neutral ground to Germany if the pass book did not bear the discharge stamp of that country; and before the same car could be admitted into Italy it must have its proper discharge from France.

A further advantage is that the new scheme does not tie the tourists to a well-defined route. A tourist, for instance, may plan to travel through Belgium, Germany, France and Italy. After leaving Germany and getting his definite discharge under the present triptyque system, he wishes to abandon the trip and return into Belgium to take a steamer home. It is impossible, for both his Belgium and German triptyques have been used up, and to return to either of these countries he must either secure a new triptyque or deposit the duty in cash at the frontier station and go through the trouble of collecting it in person when leaving. With the international pass such a change of route

would be quite admissible and would entail no more formalities than the stamping of two sheets and the tearing out of a voucher.

The scheme is so remarkably simple that it is surprising it has not been applied earlier. The motorist carries a pass book; on leaving any country a page is stamped and a voucher torn out; on entering the adjoining country the lower half of the same page is stamped and another voucher torn out. But before such a simple scheme could be applied it needed an agreement among the various national motor clubs and the customs officers. The basis of the arrangement is the guarantee given by every national motor club to be responsible for the holders of its triptyques in any other country. Thus, the French club guarantees that it will be responsible for any of its members who may take a car into Belgium with the international pass and not withdraw it in the time allowed; naturally Belgium gives the same assurance towards France. The production of this international pass is largely the work of the touring committee of the Automobile Club of France, and it is because of the leading part this club has taken in its development that the document will be printed in the French language. In order, however, to avoid trouble at the frontier stations, each national club has undertaken to make a correct translation of the pass and to supply it to every customs office on its frontiers. If the officer does not understand French he will turn to his officially certified translation for enlightenment.

The present triptyque will remain in force, but will only be used for tours in one country and will be available for one year from date of issue. Thus if an American motorist intended to tour in England and France, he would take out a French triptyque with the Royal Automobile Club. But if he intended to make a run through several European countries he would apply for the international customs pass from the same body. As the main basis of the agreement has been decided upon, and there only remain a few details to be settled, it is quite probable that the pass will be available before this year's touring season sets in.

WARNS AGAINST BAD ROAD

Ogden, Utah—Editor Motor Age—In the transcontinental map published in the February 29 Motor Age, Terrace, Utah, is noted in passing around the north end of the Great Salt lake, which is the road usually taken by one not entirely familiar with the country. It is notoriously bad and is to be entirely abandoned for what is now a fairly good desert road lying a few miles to the north. This more northern route is to be immediately marked and improved by the commissioners of Box Elder county, in which it is situated. After leaving Ogden, pass through Brigham City, Corrinne, Tremonton, Snowville, Curley, Kelton, Lucin and Montello; but keep to the north of the railroad and away from Terrace from Kelton on. Inquire at the hotel at Brigham City, and at Kelton.—O. J. Stilwell.

ASKS WAY TO MISSOURI

Tulsa, Okla.—Editor Motor Age—Kindly advise me as to the best route from Tulsa, Okla., to Hannibal, Mo., or to Louisiana, Mo., whichever might have the best roads. —W. H. Johnson.

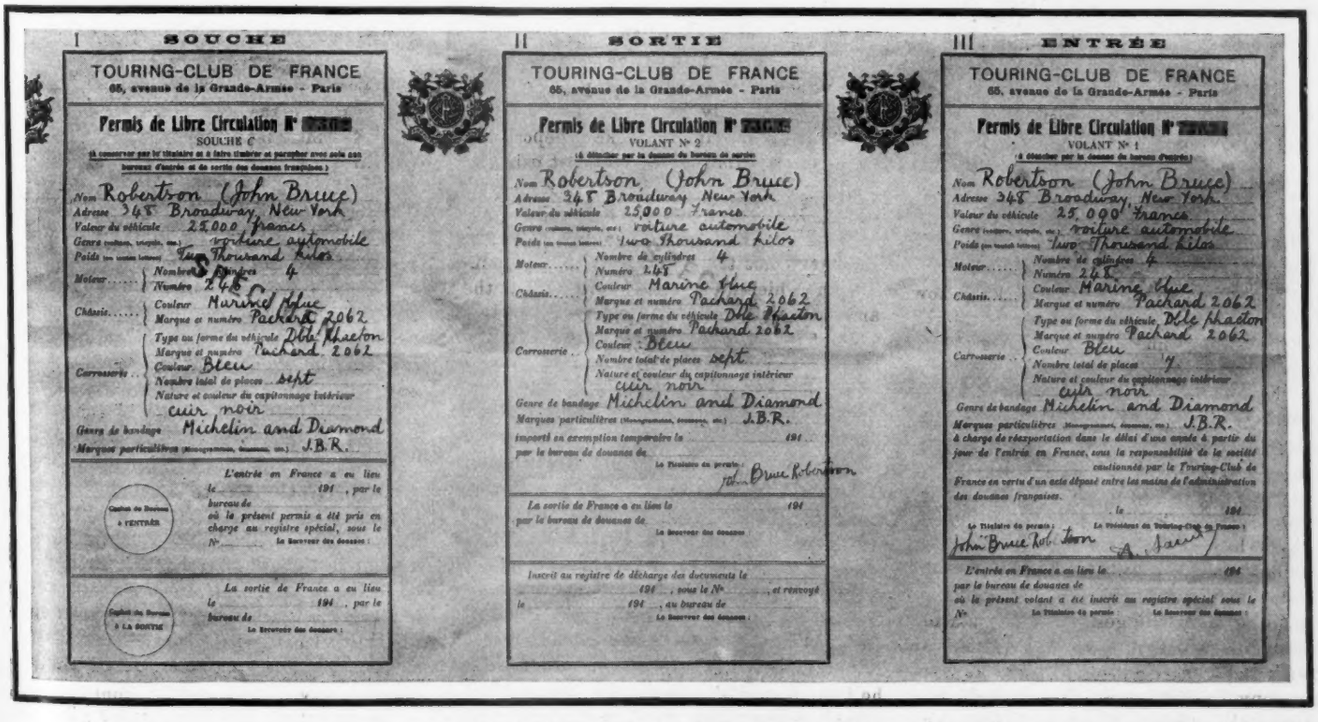
Motor Age is informed the best route from Tulsa to Kansas City follows the Santa Fe road 22 miles to Collinsville, then 12 miles till you strike the Iron Mountain road at Oolagah, and follow it to Talala, Lowata, Lenapah, and into Coffeyville. Leave Coffeyville east on Eighth street to the end of the pavement, then north 10 miles to Liberty, Cherryvale, Morehead, Thayer, Earlton, Chanute, Humbolt, Iola, Carlyle, Welda, Garnett, Ottawa, then north and east to Wellsville, Edgerton, Gardner, Olathe. Leaving the Santa Fe, follow the Frisco and electric line to Lennexa, Merriam to Rosedale and into Kansas City on Southwest boulevard. There are a number of routes from Coffeyville to Kansas City, but this one of 197 miles is the best and shortest.

Across Missouri the through route is Independence, Blue Springs, Grain Valley, Oak Grove, Odessa, Mayview, Higginsville, Corder, Blackburn, Mt. Leonard, Marshall, Slater, Glasgow, Armstrong, Yates, Higbee, Renick, Clarke, Mexico, Laddonia, Curryville, Bowling Green and Louisiana. By motoring through Franford and New London you then reach Hannibal.

GOING TO NORTH DAKOTA

Stockport, Ia.—Editor Motor Age—I am thinking of making a trip by motor car from Keokuk, Ia., to Grand Forks, N. D., and would like to know how many miles it is, and the best and shortest road and the principal towns.—R. Smutz.

Travel on the Waubonsie trail across Iowa to Shenandoah through Summitville, New Boston, Donnelson, Keosauqua, Bloomfield,


I SOUCHE

TOURING-CLUB DE FRANCE
65, avenue de la Grande-Armée - Paris

Permis de Libre Circulation N° [redacted]
SOUCHE C

Nom Robertson (John Bruce)
Adresse 348 Broadway, New York
Valeur du véhicule 25,000 francs
Genre (voiture, tricycle, etc.) voiture automobile
Poids (en toutes lettres) Two Thousand Kilos
Moteur — Nombre de cylindres 4 — Numéro 248
Châssis — Couleur Marine Blue — Marque et numéro Packard 2062
Type ou forme du véhicule Dble Phaeton — Marque et numéro Packard 2062
Carrosserie — Couleur Bleu — Nombre total de places sept — Nature et couleur du capitonnage intérieur cuir noir
Genre de bandage Michelin and Diamond
Marques particulières (Monogrammes, écussons, etc.) J.B.R.

L'entrée en France a eu lieu le ..... 191 , par le bureau de ..... où le présent permis a été pris en charge au registre spécial, sous le N° ..... Le Receveur des douanes :

Cachet du Bureau à L'ENTRÉE

La sortie de France a eu lieu le ..... 191 , par le bureau de ..... Le Receveur des douanes :

Cachet du Bureau à LA SORTIE

II SORTIE

TOURING-CLUB DE FRANCE
65, avenue de la Grande-Armée - Paris

Permis de Libre Circulation N° [redacted]
VOLANT N° 2

Nom Robertson (John Bruce)
Adresse 348 Broadway, New York
Valeur du véhicule 25,000 francs
Genre (voiture, tricycle, etc.) voiture automobile
Poids (en toutes lettres) Two Thousand Kilos
Moteur — Nombre de cylindres 4 — Numéro 248
Châssis — Couleur Marine Blue — Marque et numéro Packard 2062
Type ou forme du véhicule Dble Phaeton — Marque et numéro Packard 2062
Carrosserie — Couleur Bleu — Nombre total de places sept — Nature et couleur du capitonnage intérieur cuir noir
Genre de bandage Michelin and Diamond
Marques particulières (Monogrammes, écussons, etc.) J.B.R.
Importé en exemption temporaire le 191
par le bureau de douanes de .....
Le Titulaire du permis : John Bruce Robertson

La sortie de France a eu lieu le 191
par le bureau de douanes de .....
Le Receveur des douanes

Inscrit au registre de décharge des documents le ..... 191 , sous le N° ..... et renvoyé le ..... 191 , au bureau de .....
Le Receveur des douanes :

III ENTRÉE

TOURING-CLUB DE FRANCE
65, avenue de la Grande-Armée - Paris

Permis de Libre Circulation N° [redacted]
VOLANT N° 1

Nom Robertson (John Bruce)
Adresse 348 Broadway, New York
Valeur du véhicule 25,000 francs
Genre (voiture, tricycle, etc.) voiture automobile
Poids (en toutes lettres) Two Thousand Kilos
Moteur — Nombre de cylindres 4 — Numéro 248
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Carrosserie — Couleur Bleu — Nombre total de places 7 — Nature et couleur du capitonnage intérieur cuir noir
Genre de bandage Michelin and Diamond
Marques particulières (Monogrammes, écussons, etc.) J.B.R.
à charge de réexportation dans le délai d'une année à partir du jour de l'entrée en France, sous la responsabilité de la société cautionnée par le Touring-Club de France en vertu d'un acte déposé entre les mains de l'administration des douanes françaises.
le 191
Le Titulaire du permis : John Bruce Robertson — Le Président du Touring-Club de France : A. Javal

L'entrée en France a eu lieu le 191
par le bureau de douanes de .....
où le présent volant a été inscrit au registre spécial sous le N° .....
Le Titulaire du permis — Le Receveur des douanes :

THREE SHEETS OF A FRENCH TRIPTYQUE
NO. 3 IS DETACHED WHEN ENTERING FRANCE; NO. 2 IS DETACHED WHEN LEAVING THE COUNTRY, AND NO. 1 IS RETAINED BY THE MOTORIST. ON PRESENTATION OF NO. 1 DULY STAMPED, THE DEPOSIT IS REFUNDED

Centerville, Corydon, Leon, Mount Ayr, Bedford, Clarinda, Shenandoah, then Savannah, Tabor, Glenwood, Council Bluffs. Continue west through Omaha, Fremont, Ames, North Bend, Schuyler, Columbus, where you turn north and follow over the Meridian highway through Humphrey, Madison, Norfolk, Yankton, Salem, Madison, Arlington, Watertown, Sisseton, White Rock, Wahpeton, Fargo, Hillsboro, and Grand Forks. This distance is something like 305 miles to Council Bluffs, and 600 to Grand Forks.

TEXAS TO TENNESSEE

Clarksville, Tex.—Editor Motor Age—Please publish a route from Clarksville, Tex., to Clarendon, Tex., and also advise the distance.—David Lennox.

Traversing the Dallas-Texarkana highway, pass through Detroit, Blossom, Paris, Petty, Honey Grove, Bonham, Whitewright, Sedalia, Anna, McKinney, Plano, Richardson and Dallas. Continue to Grand Prairie, Arlington, Handley, Ft. Worth, Ben Brook, Aledo, Annetta, Weatherford, Jackboro, Wichita Falls, Iowa Park, Electra, Harold, Oklaunion, Vernon, Tolbert, Chillicothe, Danish, Quanah, Acme, Goodlet, Kirkland, Childress, Carey, Estelline, Newland, Memphis, Rowe, Lelia Lake, and Clarendon.

Clarksville to Dallas is 152 miles; Dallas to Weatherford is 66.7 miles; Weatherford to Wichita Falls is somewhere around 90 or 100 miles; Wichita Falls to Clarendon is 189.7 miles. Between Quanah and Lelia Lake the road is very poor—it is so sandy.

SAN ANTONIO HIS AIM

Burns, Kan.—Editor Motor Age—Please give the best route from Wichita, Kan., to San Antonio, Tex. I would like to avoid all the sand possible in southern Oklahoma and south of Fort Worth, Tex., if the route lies through this city.—M. W. Smith.

Motor Age believes your best route lies through Peck, Riverdale, Wellington, Caldwell, Renfrow, Medford, Pondcreek, Kremlin, Enid, Waukomis, Bison, Hennessey, Dover, Kingfisher, El Reno, Minco, Pocasset, Chickasha, Verden, Anadarko, Apache, Lawton, Emerson, Randlett, Burkburnett, Wichita Falls, Jacksboro, Weatherford, Aledo, Ben Brook, Fort Worth. By crossing the river at Burkburnett you avoid the bad stretch of sand at Bowie, Tex.

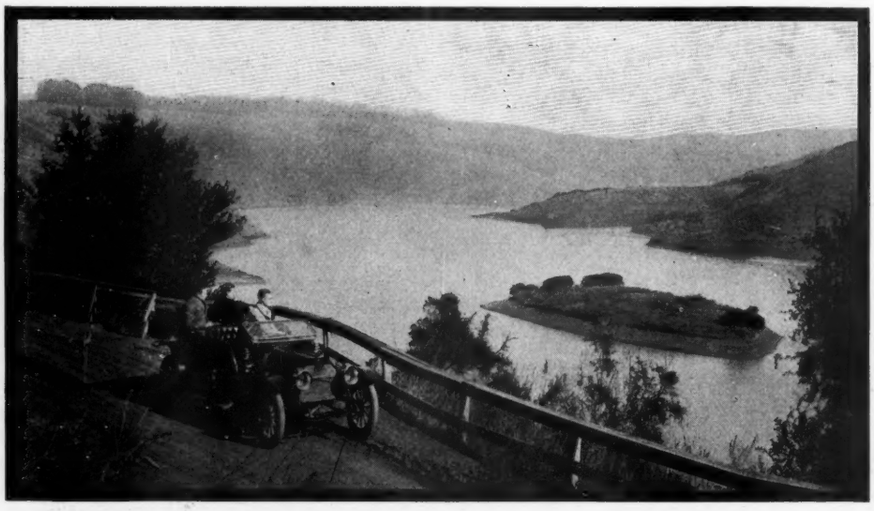
The road generally taken by Fort Worth-San Antonio motorists lies through Crowley, Cleburne, Cuba, Grandview, Itaska, Lovelace, Hillsboro, Abbott, West, Waco, Lorena, Bruceville, Eddy, Troy, Temple, Little River, Sparks, Holland, Bartlett, Granger, Jonah, Georgetown, Round Rock, Fiskville, Austin, Buda, San Marcos, Goodwin, New Braunfels, Selma and San Antonio.

If you want running directions on this Fort Worth-San Antonio road you can get them from Dawson & Potter, Fort Worth.

CORRECTS A ROUTE

Brownsville, Pa.—Editor Motor Age—Referring to the inquiry by H. C. McClung, Auburn, Ind., concerning a route through to Washington, D. C., allow me to correct the directions given for that part from Pittsburgh to Brownsville, Pa. The route given via Castle Shannon, Finleyville, Ginger Hill and Beallsville is 36 miles requiring 2½ hours hard driving in the best of weather and only found good occasionally. It is very hilly and a little stream must be crossed eleven times in 3 miles. In the end, a crossing has to be made at Brownsville by ferry. Instead, a route of 40 miles, with but 12 miles of clay roads and no bad hills, and easily covered in 2 hours, enters Brownsville on the eastern side of the river. Leaving Pittsburgh, cross Smithfield street bridge, turn left to First street, right up Brownsville road to summit, on Arlington avenue to South Eighteenth street, on Mt. Oliver, direct 3 miles, to church, turn left on Clairton road, direct on macadam, to Clairton, to railroad, turn right 1 mile to W. Elizabeth, cross Monongahela river on bridge, turn left one block, turn right at forks, 7 and 9 miles from Elizabeth, to Belle Vernon state road, direct to Fayette City, direct to Brownsville. There is a macadam road from Pittsburgh to within 4 miles of Elizabeth, and 21 miles beyond, then fair clay and stone road with 6 miles of macadam to Fayette City. The balance is fair clay and stone.

This is the route followed by all our local drivers who cover it in 1 hour 45 minutes with greater ease than the route taking 2½ hours.—A. C. Smith, M. D.



LAKE CHABOT IS BUT A SHORT DISTANC E FROM NORTH VALLEJO, CAL.

KANSAS WANTS INFORMATION

Wichita, Kans.—Editor Motor Age—What is the best route from Wichita, Kans., to Chicago and from Chicago to Traverse City, Mich.? I intend to make this trip in the early part of June.—H. E. Cone.

Follow the Sunflower trail to Newton, McPherson, Salina, Minneapolis, Concordia, Belleville, Chester, Hebron, Geneva, Fairmount, then to Exeter, Friend, Lincoln, Havelock, Waverly, Greenwood, Ashland, Millard, Omaha and cross the river to Council Bluffs. Follow the River-to-River road to Weston, Underwood, Neola, Minden, Avoca, Walnut, Marne to Atlantic and make a short-cut on the White Pole road through Anita, Adair, Menlo, Stuart, Dexter and Ortonville where you return to the River-to-River road and continue on it to Waukee, Des Moines, Mitchellville, Colfax, Newton, Kellogg, Grinnell, Brooklyn, Victor, Ladora, Marengo, South Amana, Homestead, Tiffin, Coralville, Iowa City, West Liberty, Atalissa, Moscow, Wilton, Durant, Walcott and Davenport.

The Davenport-Chicago leg takes you through Moline, Hillsdale, Erie, Lyndon, Sterling, Dixon, Ashton, Rochelle, Creston, De Kalb, Geneva, West Chicago, Lombard, Oak Park, Chicago. With South Bend the objective point motor through Byrn Mawr, South Chicago, Hammond, Highlands, Hobart, Wheeler, Valparaiso, Westville, LaPorte, New Carlisle, South Bend. Between South Bend and Traverse City the itinerary is Summerville, Pokagon, Dowagiac, Decatur, Paw Paw, Kalamazoo, Coppers Corners, Plainwell, Martin, Bradley, Wayland, Corinth, Cutlerville, Grand Rapids, Rockford, Piersons, Howard City, Morley, Stanwood, Big Rapids, Reed City, Ashton, Dewings, Tustin, Cadillac, Manton, Sherman, Monroe Center, Grawn, Traverse City.

HALF MOON BAY TOUR

Motorists who revel in exciting journeys, where the source of excitement does not depend upon speed, but upon the nature of the road and its scenic surprises, should make a trip from San Francisco down the coast to Half Moon Bay. The route is one seldom traveled by motor car.

Leaving San Francisco by the Mission road, the motorists go to Colma, thence through that town across the tracks of the Ocean Shore railroad and over the hills to a point just above Mussel rock. From there on to the town of Half Moon Bay, the route is along the beaches through mile after mile of artichoke ranches, over the mountain ridges and along the shore of Half Moon Bay.

The ascent of the hills out of Colma is very interesting, especially from the top of the ridge, where one gets many interesting

panoramic views of the lower portion of San Francisco county and the west bay shore line. The interim between leaving these viewpoints and emerging from the bluffs over the Pacific ocean is brief. Just as the last turn in the road is made, above Mussel rock, one is greeted with a striking view of San Pedro point and the intervening beaches. The latter present a lonesome appearance, in contrast with what one naturally would expect in a region where the natural attractions are as charming as those along the Pacific ocean at these points.

On reaching the summit of the grade an altitude of nearly 1,000 feet has been attained. The vista in all directions is wonderful. In the foreground, looking out over the beautiful Pacific, is the strata-marked Point Pedro, now to the north of the motorists. The view of the ocean shore, its string of beaches and rocky points, extend as far as the eye can reach north and south. Old Tamalpais in Marin county brings up the view to the north, but to the south the view fades away in the distance.

The descent to the beaches on the south side of the ridge is even more treacherous than the climb to the summit. One cannot go down in a hurry, for if a single miscue does not result in a fatality or a serious accident, it is an act of Providence. One of the grimest spectacles along the road is the hole through the fence and the gash in the side of the mountain where a car went over the edge. It is a warning which the most daring will heed. After reaching the little hamlet of Montara the motorists will find comparatively smooth sailing all the way to Half Moon Bay, from which place they may return to San Francisco by way of Spring Valley lakes road.

From a scenic standpoint this tour is unique. It is highly recommended to every motorist, but before starting be sure your brakes will hold and that your car will climb. A car with a short wheelbase will have a much easier time of it than any other.

PLANS COLORADO TRIP

Lovington, Ill.—Editor Motor Age—I am thinking of making a trip from Decatur, Ill., to Rocky Ford, Colo. I should like the best route and distance.—Tourist.

A very pleasant trip for you, although not the shortest, is to Maroa, Clinton, Wapella, Heyworth, Bloomington, Danvers, Lilly, Mackinaw, Tremont, Groveland, Peoria, Limestone, Farmington, Fairview, Ellisville, Prairie City, Bushnell, Blandinsville, La Harpe, Fort Madison, Ia. The distance so far 191 miles. The Waubonsie trail passes through Donnelson, Keosauqua, Bloomfield, Centerville, Corydon, Leon, Mount Ayr, Bedford, Clarinda, Shenandoah, Sidney, to Nebraska City. This distance is in the neighborhood of 250 or 275 miles.

Go through Syracuse, Palmyra, Lincoln, Friend, Exeter, Sutton, Harvard, Hastings, Juanita, and Minden, a distance of 195.6 miles, then turn south on the Sunflower trail to Macon, Franklin, Riemsville, Smith Center, Portis, Downs, Glen Elder, Beloit, Victor, Danmark, Vesper, Grove, Wilson, Claflin, Ellinwood. Minden to Ellinwood is 227.5 miles.

You now have reached the Sante Fe trail. Keep on this road to your destination, passing through Great Bend, Dundee, Pawnee Rock, Larned, Garfield, Kingsley, Taft, Offerle, Spearville, Wright, Dodge City, Sears, Howells, Cimmaron, Ingalls, Charleston, Pierceville, Garden City, Lakin, Hartland, Kendall, Mayline, Syracuse, Medway, Coolidge, Holly, Grenada, Morse, Lamar, Hasty, Las Animas, La Junta, Swink, Newdale, Kremis, Rocky Ford. This Santa Fe stretch is 317 miles.

ADVICE FOR IDAHO TOURISTS

Gooding, Idaho.—Editor Motor Age—From time to time I have noticed in the Motor Age the route for tourists through this section of Idaho and take the liberty of writing regarding same.

I have lived in this section of the state for the past 5 years and am well acquainted with every road within 150 miles of here, and have often talked with the tourists who travel through, and know that they have been experiencing a lot of trouble. Lincoln county is over 100 miles long from east to west and contains more irrigated land than any other county in the United States and the same has all been opened up within the last 2 years. Since the settlement has been made all the fences are on the section lines and with the thousands of ditches, laterals, and waste ditches makes it impossible for a machine to travel through this country.

From Pocatella to Glenns Ferry it is all sand, and especially where the main road runs, considerable lava rock lays just under the sand and is very hard on tires as well as springs. The correct routing from Blackfoot, is Arco, Hailey, Soldier to Dixie and strike Mountain Home which is half way from here to Boise City. This road is all prairie, no stone or sand with the exception of a few miles before getting into Arco. All the other part of the road is hard gravel, and a speed of 40 miles on hour can be made without any difficulty. From Arco to Hailey the time of running is about 3 hours, and from Hailey to Mountain Home can be made in 4 hours on the high prairie country without any grades or water to contend with.

My home is here at Gooding, but being a land man have opened up all this country and know what I am talking about.

In the map just published February 29 it will be noticed that over 40 miles can be saved as Blackfoot is directly east of Boise City. Plenty of gasoline and oil as well as repairs can be had at these towns the same as on the route named, and if scenery is wanted by taking the straight ahead road from Dixie the tourist will travel through the famous Saw Tooth Mountain range with no big grades, and run along the South Boise river to Boise City.

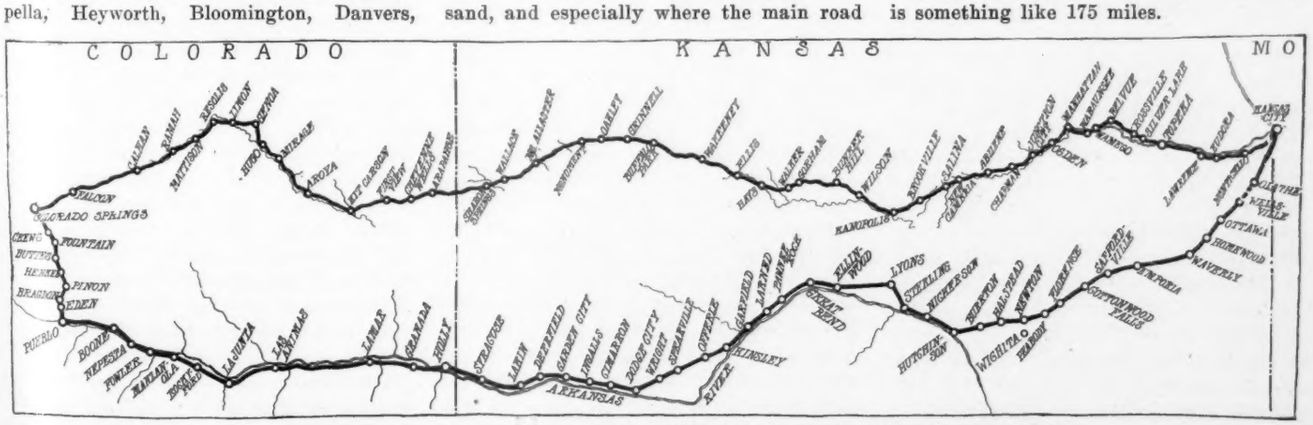
I am always glad to see the tourists come through our town, but on the other hand do not want to see them placed in the bad trail, as I have been over the road and know what it means.—J. D. Furcht.

Motor Age would like to hear more about this road, and solicits information particularly from parties who have driven over this road as well as the one following the railroad, which goes through Glenns Ferry and is the acknowledged cross-state road.

WANTS INDIANA ROUTE

Metamora, Ind.—Editor Motor Age—I should like to have the best route to Argos, Ind., from here.—W. H. Meloy.

According to the Blue Book, you would route through Connersville, Rushville, Arlington, Morristown, Carrollton, New Palestine, Indianapolis, Augusta, Rosston, Kirklin, Michigantown, Middlefork, Burlington, Darwin, Carroll, Logansport, Matea, Fulton, Rochester and Argos. This trip is something like 175 miles.



CROSS STATE ROADS CONNECTING COLORADO SPRINGS AND KANSAS CITY

Tire Road Friction

Tractive Effort Required Depends on Character of Surface and Material of Wheels

MILWAUKEE, Wis.—Editor Motor Age—I would like some information on road resistance of a motor car with solid rubber and pneumatic tires, as compared with wagon tires—iron or steel—of different widths.—Edward W. Burbank.

In a table compiled by Norris tractive effort on various tires is given as follows:

Iron	60 pounds per ton
Solid rubber	60 pounds per ton
Pneumatic	45 pounds per ton

The tractive force or power required to move vehicles along the road is variable, depending upon the condition of the road and the power applied to the wheels. Reliable tests have been made to determine the force required to overcome the combined resistance of the vehicle and the road, which have resulted in the following table:

Asphalt, artificial sheet	30 to 70 pounds per ton
Brick	15 to 40 pounds per ton
Cobble stones	50 to 100 pounds per ton
Earth roads, ordinary conditions	50 to 200 pounds per ton
Gravel roads	50 to 100 pounds per ton
Macadam	20 to 100 pounds per ton
Plank road	30 to 50 pounds per ton
Sand, ordinary condition	100 to 200 pounds per ton
Stone block	30 to 80 pounds per ton
Steel wheelway	15 to 40 pounds per ton
Wood block: Rectangular	30 to 50 pounds per ton
Wood block: Cylindrical	40 to 80 pounds per ton

According to Frost in "The Art of Roadmaking," rolling friction is affected largely by the width of the tires and can be materially decreased by increasing their width, a tire of 2½ inches wide causing fully double the wear of one 4½ inches wide. The only exceptions to this are in cases of

1—Hard and incompressible surfaces, where width makes little difference in traction, the advantage being in favor of the narrow tire.

2—Sticky and dusty surfaces, where the large quantity of mud and dust raised by the wide tires increases the draft.

A solid rubber tire offers slightly less resistance than an iron one if the road is wet and heavy, but more if the surface is hard and smooth. Pneumatic tires reduce tractive resistance from 25 to 50 per cent in increasing proportion as the road grows worse.

The size of the wheel also has much to do with tractive resistance. Acting on the principle of a lever, small wheels increase and large wheels decrease resistance, provided the diameter of the wheels is not so great that the line of traction will be downward and consume part of the power by pressing the wheel against the ground. The most economical size of wheels is considered to be about 6 feet in diameter. The effect of springs on vehicles is to diminish the wear on roads, especially above a walking pace.

The following are the general results of experiments made by M. Morin upon the resistance to traction of vehicles:

1—The resistance to traction is directly proportional to the load, and inversely proportional to the diameter of the wheel.

2—Upon a paved or hard macadamized road the resistance is independent of the width of the tire, when this exceeds from 3 to 4 inches.

3—At a walking pace, the resistance to traction is the same, under the same circumstances, for vehicles with springs and for those without springs.

4—Upon hard macadamized roads and upon paved roads, the resistance to traction increases with velocity—the increments of traction being directly proportional to the increments of velocity above the velocity of 3.28 feet per second, or about 2½ miles per hour. The equal increments of traction thus due to equal increments of velocity are less as the road is smoother, or as the vehicle is less rigid.

5—Upon soft roads of earth, sand, turf, or roads fresh and thickly graveled, the resistance to traction is independent of the velocity.

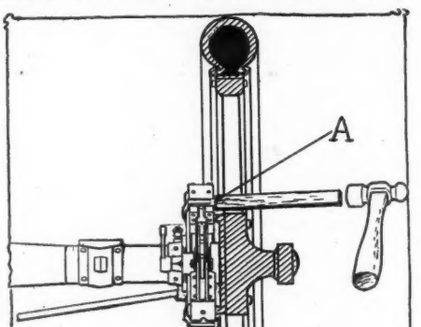


FIG. 1—E-M-F BRAKE REPAIR

6—Upon a well-made and compact pavement of hewn stones, the resistance to traction at a walking pace is not more than three-fourths of the resistance upon the best macadam.

7—The destruction of the road is, in all cases, greater as the diameters of the wheels are less, and it is greater in vehicles without than in those with springs.

The Readers'

Road Resistance of Vehicles—Authorities Quoted on Mutual Effect of Highway and Treads—Lubrication Troubles Due to Ill-Fitting Piston—Schellac for Cork Floats

SHELLAC THE BEST

Bath, N. Y.—Editor Motor Age—On my car I am using a cork float in the oil reservoir which designates whether the oil pan is full or empty, and I am experiencing considerable trouble due to the fact that the shellac on the cork float does not hold its own. It seems as if the oil causes the shellac to become full of little bubbles. Is there not a preparation that the manufacturers of motors are using to cover the cork to keep same from oil log? If so, the writer would be pleased to know of the parties or manufacturers of whom he could buy material for coating the corks.—J. P. Parrish.

Shellac is the best preparation for the purpose. It is commonly employed on the cork floats of carbureters where the conditions are similar.

Effect of Loose Piston

May Cause Missing Under Load, Fouling of Spark Plugs and Smoke—Rings a Cause

MASSENA, Iowa—Editor Motor Age—I would like very much to know what is the matter with my new 4 by 4½ four cylinder Oswald, T-head motor, fitted with a Remy magneto. It will run and speed up perfectly when idle and pull my 1911 Nyberg car nicely for a quarter to half a mile, then miss so badly that it is difficult to get the engine speeded up when idle; but when it gets up speed again it will often work perfectly for another short run.

I have changed the carbureter and now have on a new model L Schebler, with little benefit. The carbureter and manifold are 1¼ inch. Is it possible this is too large a size for the motor, causing it to choke and miss when the throttle is opened on heavy upgrade? I cannot locate the trouble as everything seems to be all right, but have had this difficulty from the beginning. I have done everything I know of or have heard of to do, and would be glad if Motor Age can tell me what is wrong with it. It will smoke like a locomotive as long as there is any oil in the engine.—H. L. Collman.

Your trouble apparently is due to loose pistons or bad rings or both. Perhaps the cylinders also are badly worn or out of round. This is hardly possible since the car is a 1911 model; unless it has been badly abused and run considerably without adequate lubrication. The carbureter is not too large; it is the size most generally used on a motor of the size mentioned. If the pistons are loose or the rings a poor fit, or stuck in their grooves, the oil will work past them and accumulate in the combustion chamber. This accumulation of oil is detrimental to the motor in that it is apt to foul the plugs; and produce excessive carbon deposits. The misfiring that takes place after the car has been run a short distance evidently is due to oil on the sparking points of the plugs. Motor Age would advise that you use a good carbon remover in your engine, or pour a teacupful of kerosene into each cylinder and leave it stand over night; then crank motor briskly and clean out and replenish the supply of oil in the motor crankcase with a medium heavy grade of good cylinder oil. If this does no good, have cylinders removed and inspected.

Clearing House

How to Make Worn Cases Useful in Increasing Mileage—No Method of Restoring Ring's Lost Spring—Manly Hydraulic Transmission System Described

Old Casings Useful

Texan Finds New Way to Employ Discarded Tires as Liners and Gives Experience

SAN ANTONIO, Tex.—Editor Motor Age—I am inclosing herewith a photograph, Fig. 2, illustrating my experience with tires, which may be of interest to readers of Motor Age, and they may profit by my experience. Like all motorists, tire troubles have pursued me, and after using two full sets of 36 by 4-inch tires, with which my car was equipped, I put on a set of 37 by 4½-inch tires. When these were worn so as to necessitate removal, I took the 36 by 4-inch tires, useless for service alone, cut off the bead, and put them inside of the 37 by 4½-inch tires. The illustration shows the result. I have made 2,500 miles in this way on tires which were absolutely useless if used singly. The picture shows the outer casing worn through and about 5 by 7 inches of the 36 by 4-inch casing exposed. This is carrying out what the inner liners are meant to do, but only in a more satisfactory manner, as every motor car owner has tires which are useless by themselves, but can be made to cut down tire expense if used as explained above. Since using these I have not had a puncture or blowout, and am more than satisfied with my experiment.—Ernest Steves.

RESTORING RING'S LOST SPRING

Vancouver, B. C.—Editor Motor Age—Kindly inform me of the method of restoring the resiliency and life to piston rings by hammering. I have heard skilled mechanics declare there is a good but difficult method of restoring rings that have lost their spring to their pristine grip of the cylinder walls. But have heard them declare it requires much skill as to weight of hammer, weight of blow and method of tapering off the blows to get the best results. I should esteem it much if Motor Age could give weight and shape of the hammer, and the method used, by a couple of sketches. Does the method make good and stand up in running? I am a good mechanic and have a good shop so I could tackle the job easily with tools at hand. Would any heat treatment before or after help any?—Auto.

To endeavor to restore the original elasticity or tension of a piston ring by peening it out is hardly to be recommended. There are few repairmen who consider themselves skillful enough to perform an operation of this kind and it is hardly probable that a man with sufficient skill would be so impractical. Motor Age would recommend that where the rings have lost their original, or pristine, grip, as you call it, new rings should be fitted as soon as convenient. Even if a ring could be peened out without seriously distorting it, the something which, perhaps is lacking in the composition of the metal, and which permitted it to lose its tension in the first place might be very difficult to obtain even by heat treatment. For this reason alone the job would be a failure.

SUGGESTS BRAKE REPAIR

Madison, S. D.—Editor Motor Age—In Motor Age, February 22, there is an inquiry in regard to stopping the rattling of brakes on the E-M-F. While the suggestion of Motor Age to fit new pins where needed in the ends of the operating rods

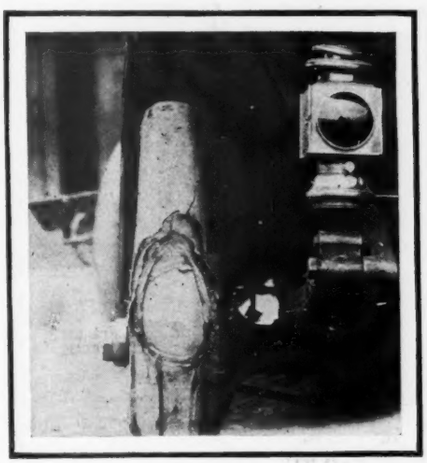


FIG. 2—OLD CASINGS AS LINERS

is a good one, yet this will not stop the rattle. If the inquirer will take a piece of wood and place it against the brake band support and then strike the other end with a hammer, he will stop the rattle. The stick should be placed through the spokes and as shown in Fig. 1.

There is a tendency for the end A to go downward as well as inward. It may be necessary to take a screw driver and pry up the end of the brake support to keep it from dragging on the brake drum. In tightening the supports one should not have them too tight or they will bind. It is a good idea to occasionally look these over and not allow them to get too loose. —H. H. Frudenfeld.

Piston Ring Pressure

Qualities Necessary to Hold Compression—Qualifications Required for Racing

MUSKEGON, Mich.—Editor Motor Age—What is the best piston ring?

2—How much pressure in pounds should each good ring give on a cylinder wall and what is the best method or instrument that is used to determine this?

3—Is a strong pressure ring most beneficial for holding compression in the cylinder and can same be too strong and score a wall?

4—How weak can a ring be and still be able to hold the compression?

5—Are there any precautions or extra care taken in rings for racing and speedy motor cars?—C. W. and C. Foundry Co.

1—From an economic standpoint and judging by the most popular practice it might be safe to state that the diagonally-slotted eccentric piston ring is the best. This, however, is an arbitrary answer, for there are many manufacturers in favor of the lap-joint piston ring; while in the new Chalmers six-cylinder motor a complicated but very efficient type of ring is employed which was previously used with great success in the old Pope-Toledo cars. This ring is pressed against the walls of the cylinder by a number of small blade springs arranged between it and the piston, in this type.

2—Motor Age has no record of any rings whose pressure or tension is reckoned in pounds per square inch; or of any instrument for testing this force of expansion, and perhaps the best advice for anyone desiring to make a set of rings would be to follow the common practice in this respect and make the rings of the same size, design and material employed by successful motor manufacturers.

3—The ring should be as strong as possible without causing excess wear of the cylinder walls. It is customary to make the rings from $\frac{1}{16}$ to 1 inch larger in diameter when fully expanded than the bore of the cylinder. This is for motors having bores ranging from 3½ to 6 inches. The exact amount of expansion required has been learned by experience, generally.

4—A ring which when assembled in the cylinder has from 1/64 to 1/32 inch space between its ends, should expand when removed so that there will be at least $\frac{1}{16}$ inch space between its ends.

5—No special care is taken in the rings of racing cars other than to see that they are made from good stock and carefully fitted. It is customary in motors having three or four rings on the piston ordinarily, to remove a couple of the rings, because at high speeds there is little chance for the compression to leak past and the vacant piston ring grooves become filled with lubricating oil and thereby facilitate lubrication. Of course, it

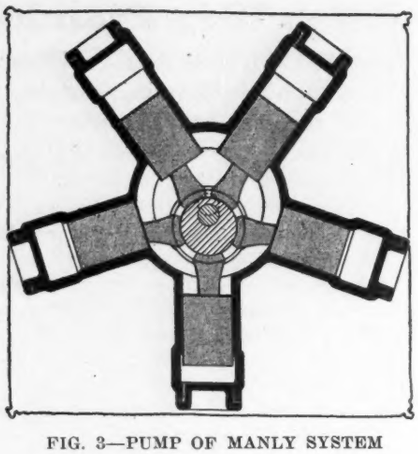


FIG. 3—PUMP OF MANLY SYSTEM

also is advantageous in a motor designed especially for racing, to make the piston rings as light as possible so that there will be less friction.

MOTOR CONTROL IN GEAR SHIFTING

Walker, Iowa—Editor Motor Age—Why do instructions tell us to retard the motor when working up through the gears on a selective transmission and to accelerate the motor when working down the same? It looks to me that it is unnecessary when clutch is thrown out or gearshift lever is at neutral position.

2—Please explain the benefits of a clutch brake when working up or down the changes.—A. G. Gary.

1—The reason the spark is retarded and the motor throttled down when shifting from a lower to a higher gear is that the motor must run slower on the high gear to drive the car at the same speed that it was running on the low gear; and vice versa, the motor is accelerated when shifting from high to low because the motor must run faster on the low gear to drive the car at the same speed than when it was on the high gear.

2—The benefits of a clutch brake in gear-changing are that by its use the gears that are to be placed in mesh would be more quickly brought to the correct speed so that they will not clash when brought into mesh.

MAGNETO ARGUMENT

Medford, Ore.—Editor Motor Age—I would like to be set straight on an argument about magnetos. I want to find out if the same results are not obtainable by advancing the armature in a magneto, such as the Bosch on the 1911 Franklin, with the governor, or some other attachment such as a spiral, where the armature can be twisted around without moving the magnets, as in the Mea where the magnets move around the armature. I understand that both of these arrangements will give a spark of the highest efficiency in advance or retard position, and that the armature will remain in the same relation to the pole pieces each time a spark occurs, whether the circuit-breaker of the magnets is advanced or retarded.

The gentleman with whom I have the argument also says that a Bosch magneto, type D U-6, will give two weak sparks each revolution of the distributor arm because the magnets have only two pulls, which throw it out of range. I claim that it gives the same spark in each cylinder because the armature is geared 1½ to 1, which brings it just right for each explosion. I wrote to both companies, the makers of the magnetos in question, but they do not give us the desired information.—A Reader.

You are right as far as the claims of the manufacturers of the respective magnetos are concerned, and as there are no official comparative tests on record, it is difficult to state whether or not the Bosch magneto equipped with an automatic advancing mechanism, would give as hot a spark as the Mea magneto.

You also are right regarding the equal efficiency of the sparks produced by the D U-6 magneto. The magneto is geared, as you state, so that there is generated in the magneto a separate impulse for each cylinder, and all the impulses are of equal strength.

TWO VS. FOUR-CYCLE

Ratcliff, Texas—Editor Motor Age—I desire a description of the comparative merits of the two-cycle and four-cycle engines. I do not wish to go into detail, but would like a short statement of the advantages of the two types.—C. D. Cantrell.

Simplicity is the chief advantage of the two-cycle motor over the four-cycle type; and the chief comparative disadvantages are asserted to be lack of flexibility and popular prejudice; though there now are two-cycle motors in use in motor cars that really are flexible. A two-cycle motor designed for high speed develops more power than a four-cycle motor of the same cylinder dimensions, and the driving torque is more uniform than in a four-cycle engine of the same number of cylinders. These advantages are offset by a slightly larger fuel consumption in the average two-cycle motor. The wear and tear is largely a matter of design, and does not depend so much on the type of motor, though it must be kept in mind that in the two-cycle there are fewer parts to wear.

The two-cycle motor, while not a potent factor in the motor car field, as yet, is fast coming to the front. It reigns supreme in the small motor boat and is to be found in a number of larger craft. The popularity of this type of motor lies entirely in its simplicity of construction and in the ability to reverse, eliminating reverse gears where the power required is small.

As far as efficiency is concerned, the two and four-cycle engines compare favorably with each other, conditions being equal. Claim is made that the drawback to the simpler two-cycle engines always has been the lack of perfect scavenging, and until this was overcome and reliable means for forcing the fresh charge into the cylinder were provided this motor was bound to remain a small factor in vehicle work.

Connecting Rod Length

Size is Determining Factor in Speed At Which Gasoline Motor May Be Run

LOUISVILLE, Ky.—Editor Motor Age—Would a connecting rod 7¾ inches long be too short for a 5-inch stroke motor? If so, what are the principal disadvantages?

2—What is the tensile strength of aluminum bronze, also gravity?—Allan Dean Gebolt.

1—The chief disadvantage of a 7¾-inch rod for use in a motor having a 5-inch stroke would be the excessive wear that would take place as a result of the side thrust of the piston in the cylinder.

"When dealing with pistons or rods, in fact the shorter the rod the greater will be the thrust on the piston, but further, as the piston and top end of the rod have to be stopped and started twice during every revolution of the engine, when the engine is turning fast there is a very considerable stress set up, due to the inertia of the reciprocating parts, and this stress has to be carried by the bottom-end bolts," says James Gunn in "Practical Design of Motor Cars." Owing to the swing or obliquity of the connecting rod, this inertia will vary with the ratio between the length of the connecting rod between its centers and the radius of the path of the crank. If the ratio between the length of the connecting rod and the stroke of the engine be high, that is, if the rod be long as compared with the stroke, the inertia stress will be considerably lower than if the length of the connecting rod be short in comparison with the stroke, or the ratio low. So important is the stress from the inertia of the piston and other reciprocating parts, that it has been regarded as a chief item in limiting the possible maximum speed at which an engine could be run. Rods which have the distance between the centers equal to two and one-half times the stroke give excellent results, and at the same time do not give too high an engine for ordinary use."

An investigation into the ratio of six standard types of motors, having a 5-inch stroke, shows the average length of the connecting rod to be about 10 inches from center to center. The shortest rod was 9 inches in length, and the longest rod 11 1/16.

2—The tensile strength and specific gravity of aluminum bronze varies with the percentage of aluminum contained in the alloy, as indicated in the following table:

TEST OF ALUMINUM BRONZE

Per cent of aluminum	Tons per sq. inch	Specific gravity
11	40 to 50	7.23
10	33 to 40	7.69
7½	25 to 30	8.00
5 or 5½	15 to 18	8.37
2½	13 to 15	8.69

Setting of Magnetos

Reader Is Puzzled by Arc of Spark Retard in Three Types of Ignition Instruments

BUFFALO, Minn.—Editor Motor Age—1—Why cannot the Remy magneto be set by the breaker box the same as Bosch and Splitdorf and get good results?

2—I understand that when setting Bosch and Splitdorf, and some other magnetos, the breaker box shall be fully retarded. Now, this being so, and the piston exactly on dead center, where is the retard when the engine is started? I believe some magneto companies claim as much as 25 degrees retard and 45 degrees advance. It seems to me that the whole 70 degrees is advance without any retard, when the breaker-box is retarded and the piston is on center.

3—When the insulated electrode on make-and-break becomes shorted, how can a satisfactory repair be made? What is used for insulation and where can one obtain it?—P. G. Liederbach.

1—The Remy magneto can be set by the breaker-box the same as the Bosch or Splitdorf with satisfactory results. This is done by simply adjusting or timing the magneto so that the points just begin to break or separate as the cylinder begins to descend on the firing stroke, and with the spark control lever in the full retard position. The line on the Remy distributer is simply provided as a more convenient means of timing the mechanism.

2—The retard obtained in the magnetos above mentioned, when set as above described, would hardly be as great as above stated except perhaps at very low speeds at which the magnetos generate a weak current. Although a magneto may be set so that the points of the circuit-breaker separate just as the piston begins to descend on its explosion stroke, this does not necessarily indicate that the explosion of the gases takes place at this time. It takes an appreciable length of time for the spark to be generated at the point of the plug, after the primary circuit has been broken; and it also takes a certain length of time for the complete ignition of the gases in the cylinder, after the spark has occurred. Thus, before complete ignition of the gases in the cylinder takes place, the crankshaft is liable to have revolved almost the 25 degrees as above stated.

There really is but little necessity for retarding the spark beyond this point; and it is because of the time necessary for complete ignition of the gases that the wider range of advance is desirable. The best practice generally is to retard the spark only as much as is necessary to prevent back firing in starting the motor.

3—When the insulated electrode on a make-and-break ignition system becomes short-circuited the most satisfactory repair consists in replacing the insulated electrode. New electrodes generally may be obtained from the manufacturer of the motor, or an agent thereof. If you had given the name of the motor it might have been possible to have given you the name of the nearest agent handling the plugs. The Locomobile company, which used a make-and-break ignition system on its cars for some time, has its agents supplied with insulated electrodes for use in these old cars when desired. Should you have one of these Locomobile cars it is most probable that you can get insulated electrodes at the Locomobile agency in Minneapolis. These are designed so as to be readily replaceable.

MANLY HYDRAULIC TRANSMISSION

Holly, Colo.—Editor Motor Age—In the January issue of Motor Age, mention was made of the Manly hydraulic transmission. I would like a reply to the following questions regarding the same:

1—Where are the firms located that use this transmission?

2—Give detailed description of pump and hydraulic motors used in construction of same.—J. A. Waters.

1—This transmission is used by the Hydraulic Truck Sales Co., New York, in its La France gasoline hydraulic trucks.

2—The device consists of a pump connected to the power generator, with one or more fluid-pressure motors attached to the driven shaft or shafts and placed in any desired location with reference to the pump, hydraulic connections between them, and a single operating lever. The pump is a multi-cylinder construction with variable stroke, attached to the driving shaft. The multi-cylinder motors have a fixed stroke, and are attached to the driven shaft, the pipe connections or passages between them transmitting the working fluid. The various cylinders, both of the pump and motors, radiate equidistantly from a central crank chamber, as shown in Fig. 3, and the pistons or plungers are connected to a single crank pin, which is common to all. The fluid used is ordinary machine oil, the lubricating qualities of which and its freedom from danger of freezing admirably fit it for such a purpose. When once filled the oil is used over and over again, being in continuous circulation from pump to motor through one set of pipes or passages and back again from motor to pump through another set. A longitudinal section of oil pump and motor is offered in Fig. 4.

The stroke of the pump may be varied at will; that of the motor is fixed. The variation of pump stroke is accomplished by a crank on which is mounted an eccentric bushing. By revolving the bushing with reference to the crank, its center line is brought into alignment with the center of the shaft, and when this position is reached no reciprocating motion is communicated to the pump plungers. When the pump is running at full stroke the motor operates at the highest speed. By varying the pump stroke and thereby the velocity of the oil in circulation, the motor runs at a speed which is exactly in proportion to the amount of oil that passes through it. Any desired rotative speed can therefore be secured and maintained. For reversal, the pump stroke first passes through the zero point. Then the valves change, and the oil is simply pumped in the opposite direction through the ports and pipes.

LIKES AIRLESS TIRES

Dayton, O.—Editor Motor Age—I note in the issue of Motor Age of April 4 a query on airless tires, and also note that Motor Age would like to hear from someone about them. I can tell my experience.

I received my 1910 Cadillac equipped with air tires on April 10, 1910. Two weeks later I had a cut about 1 inch long on one of the rear tires. I had it patched on the inside and vulcanized on the outside and it lasted about 2 weeks, then it split all around and I had to get a new tire. I used those tires until about September 1 and had a number of punctures. I then had inner liners put in, and took a trip from Dayton to Pitts-

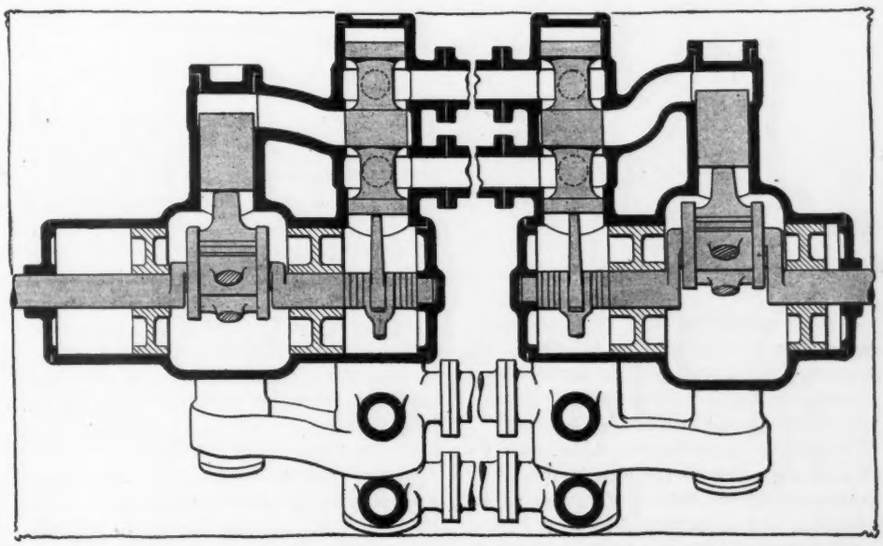


FIG. 4—SECTION THROUGH HYDRAULIC PUMP AND MOTOR OF MANLY SYSTEM

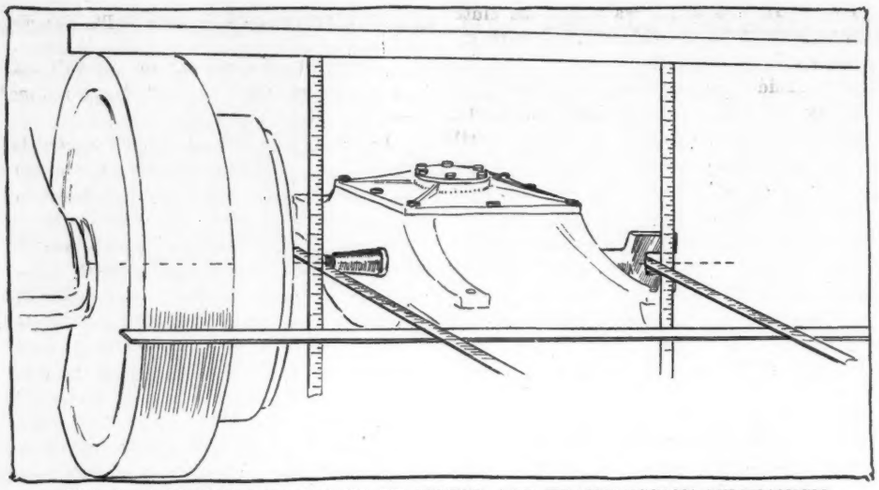


FIG. 5—A METHOD OF LINING UP MOTOR AND TRANSMISSION MECHANISM

burgh, Pittsburgh to Cleveland, and what I went through from Pittsburgh to Cleveland no one knows but myself. I had to spend $52 for a tire at Youngstown, and before I got back to Dayton I was out just $136 for tires.

In the spring of 1911 I had tire trouble about every other time I went riding, and several times I was tied up along the road some hours, until we were all thoroughly disgusted with motoring. I always carried five or six inner tubes and an extra casing, sometimes two. I secured two airless tires to try out, and was so well pleased with them I bought two more. We have not had one bit of tire trouble since we have used them on the car. We took a trip to Chicago and came home through Sandusky, making more than 2,000 miles, and wasn't out of the car once for any tire trouble. The women say these ride easier than the air tires we had been using. For anyone who has a car and wants to get the full pleasure out of it I would advise putting on airless tires. As to the knocks one hears about their making the car run hard, crystallizing axles, etc., I will say we have made as high as 247 miles in one day, and ran 103 miles on 5 gallons of gasoline, and never had a break of any kind. We are absolutely satisfied with them and have had two tires run 8,500 miles.

I write this only to let someone who has had a great deal of tire trouble know the real pleasure of motoring without the worry of having a tire puncture or blowout on some lonely road at night, as I have experienced.—F. W. Blum.

BALLS FOR CHECK VALVES

Victoria, B. C.—Editor Motor Age—I want to order some balls for some check valves but I do not know how to order the size. Are they specified by number?

2—Where could I obtain a copy of patents taken out for mufflers?—Victorian.

1—Steel balls for check valves may be ordered according to the size in inches or fractions thereof desired. They come in practically all sizes from 1-16 to 4 inches in variations of 32nds of an inch, even special sizes, perhaps larger or smaller than these and in greater variation, may be obtained in large quantities.

2—Write to the Honorable Commissioner of Patents, Washington, D. C., requesting that he give you a list of patents taken out for mufflers, and inquiring into the cost if the entire list be purchased. Copies of patents may be obtained at a cost of 5 cents each if a few individual patents are ordered, but if all patents on a certain device are requested, where there are a great number involved, a reduction in the price generally may be obtained.

VARIOUS GEAR RATIOS

Editor Motor Age—What is the gear ratio of the E-M-F roadster on high gear, the Flanders roadster and Flanders Special on high gear, and the Garford six on fourth speed?

2—What is the highest speed of the E-M-F roadster?

3—What is the speed of the Garford six roadster?

4—Is the rating of the horsepower of the Knight motor any different from the S. A. E.?—Will Deane.

1—The gear ratio of the E-M-F roadster on high gear is 3⅝ to 1, the Flanders roadster is 3¾ to 1, and the Special 3½ to 1 on high gear. The Garford is geared 3 to 1 on fourth speed and 3½ to 1 on third or direct drive.

2—The highest official speed of the E-M-F roadster, averaged during the Tiedeman trophy road race at Savannah, Ga., Thanksgiving day, 1911, was 58.32 miles per hour over a distance of 141.4 miles. The highest speed claimed for this car is 68 miles an hour.

3—A speed of 80 miles an hour is claimed for the Garford six. During tests with a stripped chassis, but fully equipped, the Garford agency in Chicago claims a speed of 60 miles per hour. No official records are at hand as the Garford does not enter race competitions.

4—The S. A. E., or the A. L. A. M. horsepower rating applies to the Knight motor as to all other motors, but the engine will develop more power than it indicates.

Heavier Oil the Cure

Pennsylvania Subscriber Suggests Possible Cause for Flanders' Trouble of Fouling

JOHNSTOWN, Pa.—Editor Motor Age—I notice in the March 28 issue W. C. Haight's oil trouble with a Flanders 20 and thought probably my experience with an E-M-F 30 might be of interest to him. I had the same trouble with oil when I first commenced to drive this car in 1909, but not as bad, as I could get about 90 miles to the gallon of oil and had trouble in keeping the two back spark plugs clean enough to fire steadily. This was a great annoyance. On the first trip over the Allegheny mountains I had so much trouble that I was disgusted with the car and made up my mind to sell it if I could not overcome the trouble. I asked everybody I thought should know, but all the advice was, the cylinders were not a good fit and let the oil work up.

But I was not satisfied with this and got to looking around the car and found that there must be several other parts that were not a good fit. On thinking this over I came to the conclusion that I was simply using too light an oil, as the car had all the power that was necessary and the compression even in each cylinder, as nearly as I could tell by turning it over by hand. So I started a hunt for a very heavy body oil and finally found what I thought was right and very carefully cleaned out all the light oil in the crankcase and also the reservoir. I then put ½ gallon in the front breather pipe and the same quantity in the back breather pipe. This is very necessary as the crankcase is divided into two compartments by a middle casting and the oil from the one end cannot get into the other until the case is flooded.

Let me state that when the cap is screwed down tightly the reservoir must be absolutely air-tight, and if it is not, must be made so by new leather washers in the top cap plug and also on the bottom cap. This holds the valve up by a spring to shut the oil off only when the top cap is taken off to fill; the top cap when in place pushes this valve stem down off the seat so the oil can feed as it is needed in the crankcase. I have had no trouble at all with the plugs and there has been no waste of oil and the mileage was increased. The oil must be very heavy, for if the crankcase gets hot a thin oil is wasted.—W. G. Mitchell.

HOLLEY CARBURETER ON FORD

In answer to an inquiry on page 26 of March 28 issue of Motor Age, regarding trouble with a Holley carbureter on a 1912 Ford car, it was suggested that the trouble might be due to faulty adjustment of the air valve, air valve stuck, or weak or broken air valve spring. This information, while applicable to most carbureter designs, seems unjust to the Holley carbureter, as it has no air valves or springs; and it is suggested by the manufacturers that the trouble most probably is caused by dirt in the gasoline which has lodged under the adjusting needle.

Lining Up the Engine

Proper Way of Aligning Motor, Clutch and Gearbox Illustrated and Described

VANCOUVER, B. C.—Editor Motor Age—Please advise me of some practical methods of aligning engine, clutch and gearbox in motor cars, so they will be in line and true in every direction.

2—In the event of a multiple-disk—Winton—clutch being thrown out of adjustment, or true, by the tightening of one or two of the tensions more than others, can Motor Age give a practical test for locating the trouble, the amount it is out of true, and which tension, and the method of putting same right all around most easily? The Winton clutch has four tension screws which must be tightened equally.

3—A quick and reliable method of testing motor car cylinders for oval or wear in one place will also be much esteemed.—Transit.

1—There are almost as many different ways of aligning the engine, clutch and gearbox of a motor car as there are makes of cars; for the best method employed is most apt to vary with the design of the car. If you had given us the name and model of the car, or cars, whose alignment you are desirous of checking, it would have been easier to learn the methods employed either by the manufacturer or some repair man in the large agencies. In the Winton car, for instance, a T-square is practically all that is needed in lining up the motor, clutch and transmission gearset. The clutch is contained in the same case with the change-speed gears and is not apt to get out of line therewith. It only remains to see that flywheel end of coupling lines up with the similar square portion on the forward end of the transmission shaft. This is readily done by means of a small try-square, as indicated in Fig. 6. The square should rest flat upon both the top horizontal surfaces of the couplings; and the vertical surfaces should be parallel. Should the motor or gearset fail to line up properly, shims composed of little pieces of brass, tin or copper should be placed under the legs of the gearset or motor to raise them into the desired position. To insure that the square blocks of the coupling are parallel measure the distances A-B-C and D at right angles from block to block.

2—If the multiple-disk clutch on a Winton car is out of adjustment, remove the lock plate from the adjusting set screws, then loosen the set screws until the ends of the springs touch the disk in which the set screws are threaded. These springs are all of the same length and tension, so in setting the screws each should get the same number of turns. Your trouble perhaps is caused by grease from the transmission getting into the clutch casing and thickening the lubricant therein to such an extent that slipping of the clutch takes place. In this event wash out the clutch casing with kerosene, then refill with cylinder oil.

3—Inside micrometers are most generally used for testing motor car cylinders for wear and roundness. A little practice is necessary in using micrometers to the best advantage, but if used carefully and with caution to see that the instrument is placed at right angles to the cylinder wall they are very reliable. Manufacturers have hand gauges consisting of large metal disks with a handle extending outward at right angles from the center of one side, for this purpose. But unless you have one type and size of motor to deal with it would hardly pay to have one of these made. Such a gauge might be obtained from the factory, however, at a reasonable cost if desired.

LOOK AT YOUR OILER

Agricola, Kas.—Editor Motor Age—Why do the two center cylinders on an Overland car foul plugs while the end cylinders work clean? Change the plugs and they will foul. Is it too rich a mixture?—F. H. Williams.

If your motor is equipped with a mechanical oiler, it is probable that it is feeding too much oil to the two center cylinders, in which case the trouble could easily be remedied by adjusting the feeds to these two leads. Adjustments are provided for this purpose on the oiler, and it would be advisable to cut down the supply gradually until the fouling ceases. It is customary to adjust the screws on the oiler so that ½ inch of the thread shows for the leads to the cylinders, and about 3-16 inch of thread for the main bearing leads.

If your motor has a splash system, your trouble most probably is due to ill-fitting piston rings; or perhaps they are simply stuck in their grooves. If they are stuck as a result of accumulations of carbon and sticky oil, they may be loosened up by injecting a few tablespoons of a mixture of half kerosene and half alcohol into the cylinders when the pistons are halfway down in the cylinders. This should be allowed to stand in the motor over night, in order that it may seep down past and around the rings, and dissolve the sticky oil that binds the carbon and the rings. If this does not relieve the trouble, it is recommended that you cut four vertical grooves at equal distances apart around the circumference of the pistons; these grooves to extend from the annular oil grooves near the bottom of the pistons down to the bottom of the pistons. Their object is to drain the superfluous oil from the grooves. A more definite answer generally can be given if the model of the car is mentioned.

ILLINOIS' ROAD FUND

Delavan, Ill.—Editor Motor Age—What disposition is to be made of the money received by the Illinois motor car department.

2—Who has the autority in each township or county to receipt for and to pay out said fund?

3—Should a license pay for the full year, on a car purchased in April, May or June?—A. A. A. 415.

1—The last legislature which enacted the law in force at the present time decided that all moneys received from the registration of motor cars and from chauffeurs' licenses should go into a road fund. The legislature, however, failed to make the necessary appropriation, so that the money collected for this fund the last 6 months of 1911 and during the present year will have to stay in the treasury until the next session of the legislature, which will be held in 1913, when the necessary appropriation can be made.

2—In answer to this Motor Age refers you to section 19 of the state law, which reads: "All moneys received by the secretary of state as registration fees and for the examination and licensing of chauffeurs as provided for in this act, less the cost of procuring and delivering the registration certificates, registration seals and number plates as provided in this act, shall be deposited in the state treasury and set apart as a special fund to be known as the road fund, which shall be used solely for the permanent improvements of the highways of the state outside of any incorporated city, town or village, and shall be subject to appropriation by the general assembly for that purpose only. The amount appropriated and expended from such road fund in any county for the permanent improvement of the highways within its limits, in any one year, shall be in the same proportion as the amount levied in each county for road and bridge taxes bears to the total amount of the road and bridge tax levied in all counties of the state."

3—If it is a new car or one just brought into the state you will pay pro rata for the balance of the year. An old car is supposed to be already registered. If it isn't you will have to pay from the first of the year.

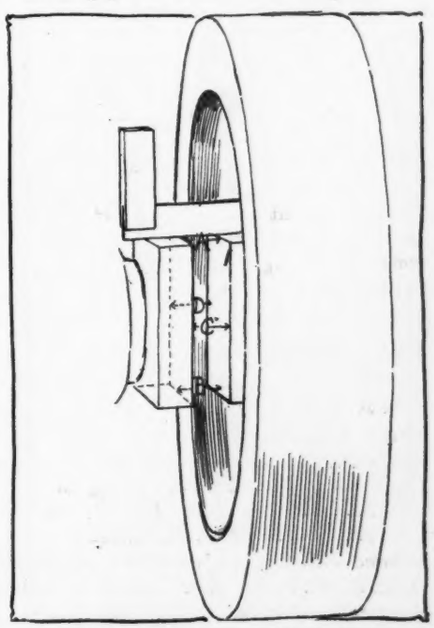


FIG. 6—LINING UP TRANSMISSION

The Mathematics of Motoring

THERE are many instances in the discussion of motoring questions in which dimensions of parts are given in decimals of an inch instead of the more common fractions. Particularly is this true in dealing with the fit of parts and the allowances for bearings. It is a practically general rule in motor car factories that dimensions smaller than 1-64th inch be stated decimally in hundredths, thousandths or ten-thousandths of an inch as the need of accuracy may dictate.

The conversion of the common fractions to their decimal equivalents does not require any great amount of figuring. It is only necessary to divide the numerator of the fraction by its denominator and point off the proper number of places. For instance, to take a familiar one: to find the decimal equivalent of ¼, divide 1 by 4. This we know is .25. The most usual method in pointing off the decimal places is to multiply the numerator by the proper amount before division. In this case, it is 100 and 1 × 100 equals 100; 100 divided by 4 equals 25. To change decimals of an inch to their fractional equivalents is just as easy. Simply divide 1 by the decimal. Thus, the equivalent of .25 is found by dividing 1 by .25, which gives 4 for the denominator of the fraction, and the fraction is ¼.

Equivalents of Fractions of an Inch in Decimals and Millimeters and Short Method of Conversion —Table of Equivalents

Editor's Note—This is the first of a series of short discussions on the calculations which interest motorists. Though the first few articles of necessity must be somewhat elementary, it is intended later to take up the more important calculations concerning which many readers seem to be in doubt, such as horsepower fomulae, effect of change of gear ratio, speed determination and similar subjects. It is intended each week to publish in connection with these, tables and diagrams and other short-cuts, so that the entire series, if preserved, will form a hand-book of motoring data

Small European dimensions are always given in millimeters, a method often confusing to the American mind. But this is simple, too, if it is remembered that there are 39 millimeters in an inch—39.37 to be exact. A better figure to remember for small dimensions is that 1-64 inch equals approximately .4 millimeter. The exact figure is .3969. So, if we divide any dimension which is expressed in millimeters by .4 we will have the English equivalent in 64ths of an inch. For instance, take 6.35 millimeters. This divided by .4 equals 15.8, or approximately 16; 16/64 inch is our familiar ¼ inch.

When it is desired to change decimals of an inch to their equivalents in millimeters it is only necessary to multiply .4 by the number of 64ths the fraction represents. For instance, ¼ is 16/64; .4 × 16 equals 6.4 millimeters.

The results obtained by taking .4 millimeter as equal to 1/64 inch are not exact, but are nearly enough correct for ordinary purposes and have the merit of being rapid. The exact equivalents in decimals and millimeters of the ordinary fractional parts of an inch as used in factories and repair shops are given in the accompanying table. The decimal equivalents are correct to the hundred-thousandth of an inch and the metric equivalents are correct to the hundredth of a millimeter which is close enough for ordinary work.

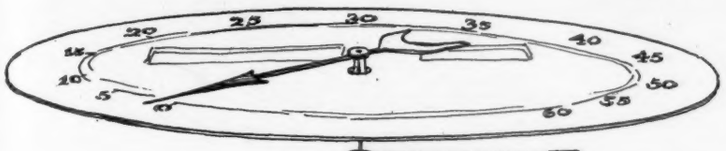
Fractions of an Inch in Decimals and Millimeters

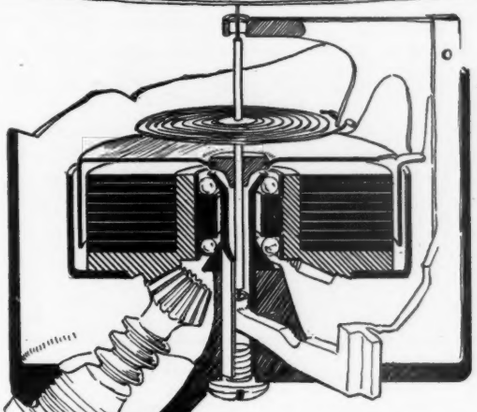
¼ and over	8ths	16ths	32nds	64ths	Decimals	m.m.
.....	.....	.....	.....	1	.015625	0.397
.....	.....	.....	1	2	.031250	0.794
.....	.....	.....	.....	3	.046875	1.191
.....	.....	1	2	4	.062500	1.159
.....	.....	.....	.....	5	.078125	1.984
.....	.....	.....	3	6	.093750	2.381
.....	.....	.....	.....	7	.109375	2.778
.....	1	2	4	8	.125000	3.175
.....	.....	.....	.....	9	.140625	3.572
.....	.....	.....	5	10	.156250	3.969
.....	.....	.....	.....	11	.171875	4.366
.....	.....	3	6	12	.187500	4.762
.....	.....	.....	.....	13	.203125	5.159
.....	.....	.....	7	14	.218750	5.556
.....	.....	.....	.....	15	.234375	5.953
¼	2	4	8	16	.250000	6.350
.....	.....	.....	.....	17	.265625	6.747
.....	.....	.....	9	18	.281250	7.144
.....	.....	.....	.....	19	.296875	7.541
.....	.....	5	10	20	.312500	7.938
.....	.....	.....	.....	21	.328125	8.335
.....	.....	.....	11	22	.343750	8.732
.....	.....	.....	.....	23	.359375	9.129
.....	3	6	12	24	.375000	9.524
.....	.....	.....	.....	25	.390625	9.921
.....	.....	.....	13	26	.406250	10.318
.....	.....	.....	.....	27	.421875	10.715
.....	.....	7	14	28	.437500	11.112
.....	.....	.....	.....	29	.453125	11.509
.....	.....	.....	15	30	.468750	11.906
.....	.....	.....	.....	31	.484375	12.303
½	4	8	16	32	.500000	12.700

¼ and over	8ths	16ths	32nds	64ths	Decimals	m.m
.....	.....	.....	.....	33	.515625	13.097
.....	.....	.....	17	34	.531250	13.494
.....	.....	.....	.....	35	.546875	13.891
.....	.....	9	18	36	.562500	14.288
.....	.....	.....	.....	37	.578125	14.685
.....	.....	.....	19	38	.593750	15.082
.....	.....	.....	.....	39	.609375	15.479
.....	5	10	20	40	.625000	15.876
.....	.....	.....	.....	41	.640625	16.273
.....	.....	.....	21	42	.656250	16.670
.....	.....	.....	.....	43	.671875	17.067
.....	.....	11	22	44	.687500	17.464
.....	.....	.....	.....	45	.703125	17.861
.....	.....	.....	23	46	.718750	18.238
.....	.....	.....	.....	47	.734375	18.635
¾	6	12	24	48	.750000	19.048
.....	.....	.....	.....	49	.765625	19.445
.....	.....	.....	25	50	.781250	19.842
.....	.....	.....	.....	51	.796875	20.239
.....	.....	13	26	52	.812500	20.636
.....	.....	.....	.....	53	.828125	21.033
.....	.....	.....	27	54	.843750	21.430
.....	.....	.....	.....	55	.859375	21.827
.....	7	14	28	56	.875000	22.224
.....	.....	.....	.....	57	.890625	22.621
.....	.....	.....	29	58	.906250	23.018
.....	.....	.....	.....	59	.921875	23.415
.....	.....	15	30	60	.937500	23.812
.....	.....	.....	.....	61	.953125	24.209
.....	.....	.....	31	62	.968750	24.606
.....	.....	.....	.....	63	.984375	25.003
1	8	16	32	64	1.000000	25.400

Speedometers and How They Are Made

Modern Device Tells Motorist Speed at Which He Travels While Odometer Aids in Keeping Tab on Life of Tires and Fuel Consumption





By George W. Gaidzik

IN order that the practical motorist may know the speed at which his car is traveling, there are instruments on the market which are known as speedometers; and in order that he may have a record of the number of miles his car has run during a trip, or throughout the season, there generally is incorporated within the speedometer casing a mechanism known as an odometer.

Not only do these mechanisms provide a means of ascertaining at a glance the distance covered for each journey, for the season or for the year, but they aid in obtaining a knowledge of the life of the tires, the consumption of oil and gasoline, and numerous other interesting questions which depend upon a record of the number of miles traveled. They also form a check against the unauthorized use of the car; and provide a means of judging the state of the car's mechanical condition.

There are a number of speedometers on the market, which operate upon several different principles; but in that which follows, the principle, construction and manufacture of the Stewart speedometer as made by the Stewart & Clark Mfg. Co. of Chicago is described and illustrated in a simple and elementary manner.

Process of Manufacture of Indicating Instrument Well Illustrated at Stewart & Clark Plant in Chicago

As illustrated on this page, the Stewart speedometer primarily is composed of three parts—the swivel joint and gears by means of which the flexible driving shaft is driven from the wheel; the shaft, and the tube in which it is encased; and the clocklike part which is designed for attachment to the dashboard of the vehicle, and whose mechanism is driven by the flexible shaft.

The principle upon which the Stewart speedometer operates, is that of the magnetic influence of a rotating magnet upon a light metal cup arranged to float in the magnetic field created by the magnet. An effort has been made to illustrate the principle on this page.

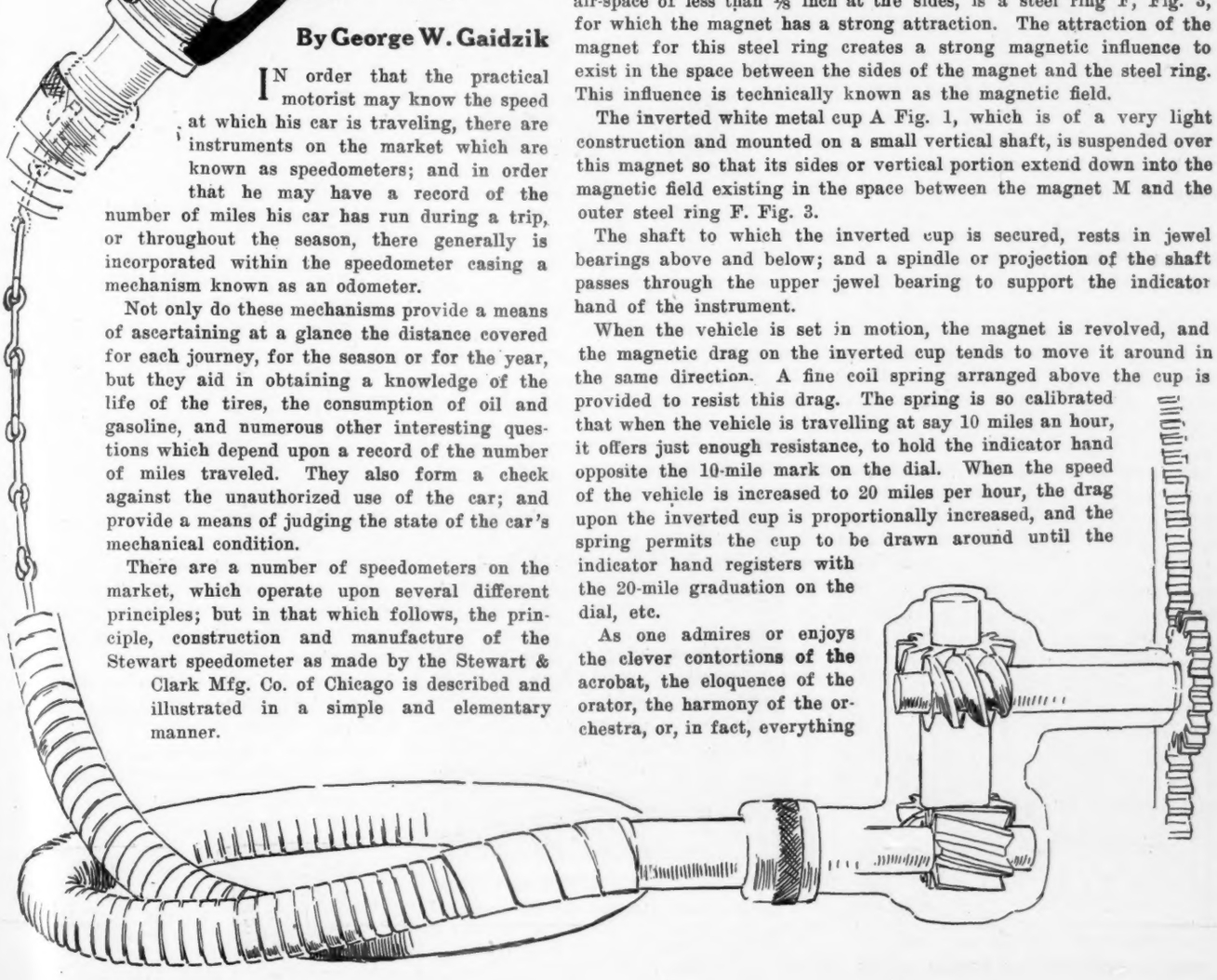
The magnet is mounted by a double row of ball bearings on a hollow vertical spindle, and is revolved by the flexible shaft which communicates with the road wheel. Attached to the magnet but insulated therefrom by an aluminum driving disk below, and by an air-space of less than ⅛ inch at the sides, is a steel ring F, Fig. 3, for which the magnet has a strong attraction. The attraction of the magnet for this steel ring creates a strong magnetic influence to exist in the space between the sides of the magnet and the steel ring. This influence is technically known as the magnetic field.

The inverted white metal cup A Fig. 1, which is of a very light construction and mounted on a small vertical shaft, is suspended over this magnet so that its sides or vertical portion extend down into the magnetic field existing in the space between the magnet M and the outer steel ring F. Fig. 3.

The shaft to which the inverted cup is secured, rests in jewel bearings above and below; and a spindle or projection of the shaft passes through the upper jewel bearing to support the indicator hand of the instrument.

When the vehicle is set in motion, the magnet is revolved, and the magnetic drag on the inverted cup tends to move it around in the same direction. A fine coil spring arranged above the cup is provided to resist this drag. The spring is so calibrated that when the vehicle is travelling at say 10 miles an hour, it offers just enough resistance, to hold the indicator hand opposite the 10-mile mark on the dial. When the speed of the vehicle is increased to 20 miles per hour, the drag upon the inverted cup is proportionally increased, and the spring permits the cup to be drawn around until the indicator hand registers with the 20-mile graduation on the dial, etc.

As one admires or enjoys the clever contortions of the acrobat, the eloquence of the orator, the harmony of the orchestra, or, in fact, everything



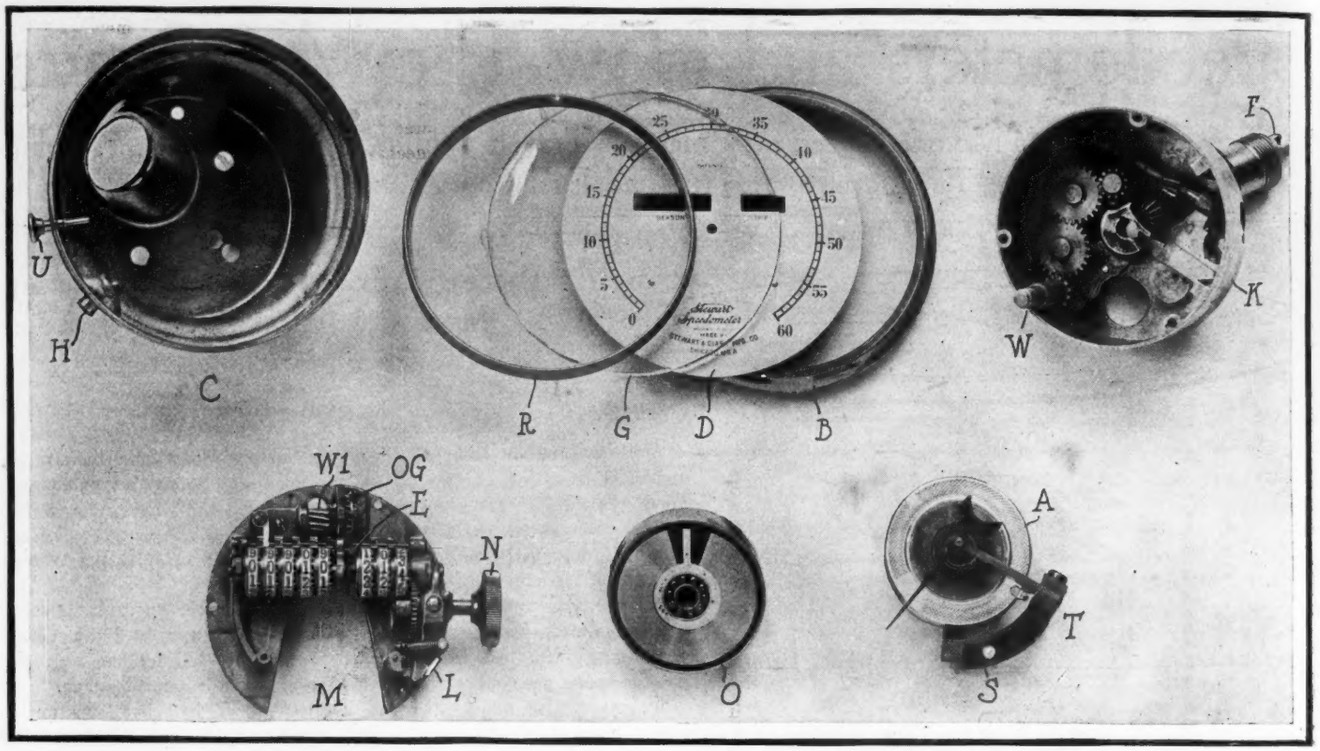


FIG. 1—SHOWING COMPONENT PARTS OF STEWART SPEEDOMETER DISASSEMBLED

that is done well; so is one, capable of appreciating the operations of a modern manufacturing plant, impressed with means and processes employed in the manufacture of the Stewart speedometer.

Making the Case

The case C, Fig. 1, for instance, is made complete from a strip of sheet brass into the highly polished finished product in about eight operations. First the case is blanked B, Fig. 2, and formed F in a punch press, into which is fed the strip P of sheet brass. The case thus formed, is then annealed by placing it in a gas furnace, heating it to a red heat, about 1400 degrees Fahrenheit, then quenching in cold water. This annealing is to soften the metal and thereby facilitate the following operations upon it.

After the annealing, the forms are placed in another press, and the stem S, Fig. 5, drawn or pressed into the bottom, then the bottom of the stem is squared out and pierced; that is the bottom is cut out leaving a large hole H, through which the main driving shaft subsequently passes. All of this is done at one operation in a press that works upon two cases or forms at the same time.

The cases are next placed in a large automatic machine which has four spindles, and performs four operations upon four cases at the same time. One of these machines turns out from 800 to 900 cases in one 10-hour day. The operations performed on this machine are indicated in Fig. 8. First, on one spindle, the edge E of the case is

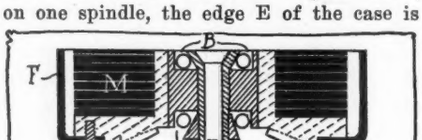


FIG. 3—A SECTIONAL VIEW OF ROTOR
Showing Laminated Magnet M, Steel Field-Ring F, Insulating and Driving Disk C, Ball-Bearing Race B.

trimmed to size and squared up; while this operation is going on, another spindle is rolling a knurl K on another case which already has been through the first operation; still another spindle is counterboring the inside of a case at B for the reception of the dial; and the fourth spindle is taking a forming cut C and C 1 off the outside, on both sides of the knurl K to make it stand out.

The cases now are fed into another punch press and five holes are pierced in the bottom at one time. Next they are placed on a jig and the holes O, P, 2, Fig. 7, are drilled in the side. The cases then go to the buffing room where they are polished on automatic buffing machines. Each one of these machines polishes two cases at a time and keeps a man busy loading, and removing the polished cases. These machines have a capacity of about 1200 cases a day, as compared with 125 per day when done by hand. So are the cases completed. The bezel ring which holds the glass and dial in place is made in a similar manner, but requires fewer operations.

Skeleton Cup in the Making

The skeleton cup is practically the framework or foundation of the instrument for into it are assembled all of the working mechanisms. This cup is a die casting, formed from a molten white metal alloy in a special die-casting machine such as is shown in Fig. 11.

A feature of this skeleton cup formation is that all holes and lugs for attachment of the mechanism are formed in the casting,

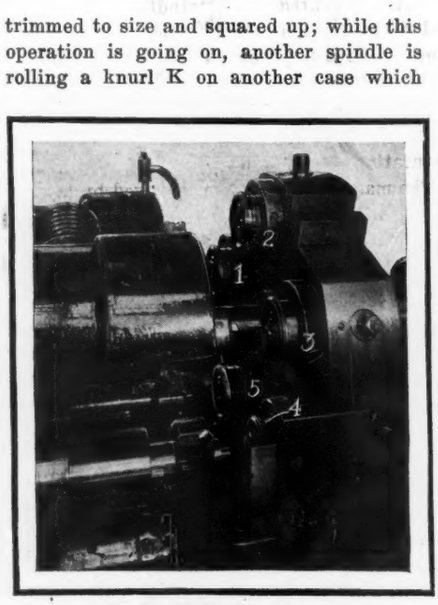


FIG. 4—MACHINING BEZEL RINGS
Automatic Multiple-Spindle Turret Machine in Which Eight or Ten Tools Work on Five Pieces at Once.

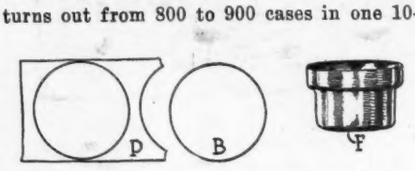


FIG. 2—PRODUCT OF PUNCH PRESS

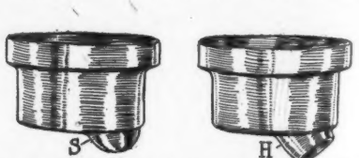


FIG. 5—FORMING AND PIERCING STEM

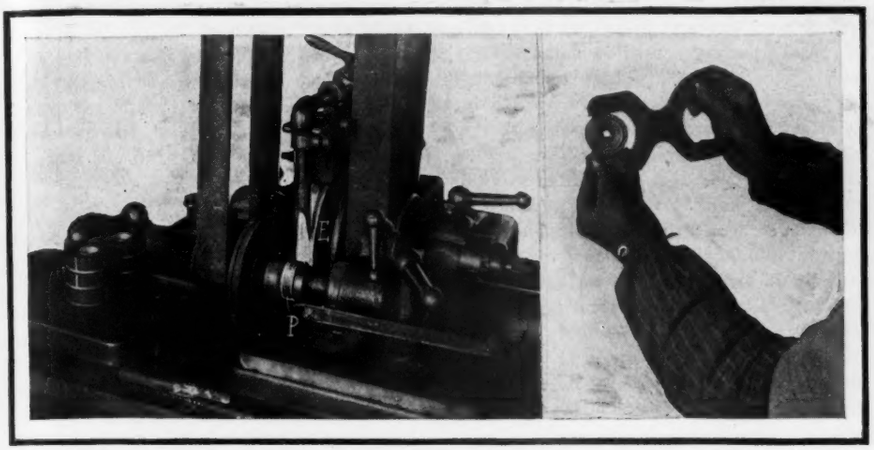


FIG. 6—GRINDING MAGNETS AND TESTING SIZE WITH GUAGE

even with the threads formed in some of the holes requiring them. This construction greatly simplifies the process of manufacture and consequently reduces the expense thereof. The castings are so clean that but little cleaning is required, and

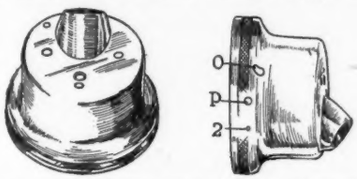


FIG. 7—PERFORATING THE CASING

after the burrs have been removed, the large thread for the driving spindle F, Fig. 1, is chased or cleaned out with a tap in a drill press; the holes which are cast in the lugs are tapped; then the skeleton is brass-plated and lacquered to fill the pores of the casting and thereby insulate the magnet.

Magnet Laminated Construction

The magnet is made up of seven layers of special magnet steel highly charged with tungsten. This is known as a lamellar or laminated construction. The laminae or plates that go to make up the magnets are blanked, formed, pierced and straightened in one operation of a punch-press, and at a rate of 1000 per hour. Seven of these plates are riveted together as illustrated in Fig. 9, and sent to the hardening room, where they are heated to about 2000 degrees Fahrenheit, then thrown into a special quenching machine filled with brine

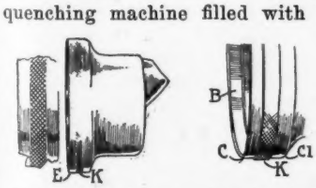


FIG. 8—FORMING THE KNURL

or salt water, through which a constant current of air is passed. This hardens them and adds to their ability to retain their magnetism when once saturated.

The rotor or revolving part of the mechanism is comprised of three principal parts: the magnet M, Fig. 3, the die-cast non-magnetic core and driving disk C, and the pressed-steel cup or field-piece F.

The combined core and driving disk is made of white metal in the same kind of machine in which the skeleton is produced. This part serves as an insulator and has the bevel gear teeth which mesh with the main driving pinion cast on the underside of it. The magnet is pressed onto this part in an arbor press; then it is sent to the grinding room to be ground to size and polished. In grinding the top faces of these parts, fifty-two pieces are assembled onto a tray and run through a large surface grinder having a magnetic chuck. Thus they are quickly ground to an exact and uniform size. The outside surface is next ground to size as shown in Fig. 6; the part

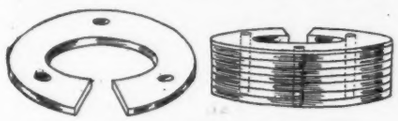


FIG. 9—LAMINATIONS OF MAGNET

P being mounted on a spindle which revolves rapidly in an anti-clockwise direction, while a large emery wheel W, which also revolves at a high rate of speed in the same direction, is brought into contact with it.

Saturating the Magnets

The magnets are next magnetized by laying them against a powerful electromagnet of special design; after which they are assembled on trays and immersed for about 20 minutes in a bath of boiling oil. The oil bath serves to make the magnet permanent; in other words, it aids retaining the magnetic strength of the magnet. After this treatment, each magnet is mounted on a spindle and revolved at a speed of from 7000 to 8000 revolutions per minute, so that all excess oil may be thrown out from between the liminae. The magnet then is ready for assembly.

The field-piece F, Fig. 3, is blanked, formed and pierced in a punch press in one operation, from sheet steel; it then is nickel-plated, pressed onto the white metal disk, and secured to it by three brass screws. The rotor is then ready for the case-hardened bearing-race member B, which is pressed into place; next the balls and carrying post are assembled. Many ingenious little devices are employed in the assembly of these and other parts of the mechanism.

Many Automatic Machines Used

Practically all of the smaller parts of the mechanism are made from bar stock in automatic screw machines. The carrying post, for example, goes into the automatic screw machine in the form of a rod, and comes out drilled, threaded on the inside of one end, slotted, and with a cone shaped on the opposite end. No workman is required at the machine during the operation, it being necessary simply to start the long rod into the machine, and afterward collect the finished pole pieces, which have been dropped into a pan beneath the machine. By finished pole pieces is meant that they are finished as far as their forma-

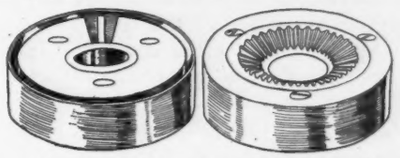


FIG. 10—ROTOR, TOP AND BOTTOM

tion is concerned; it still remains for them to be case-hardened. The case-hardening process consists in packing a great many of these small parts together with a hardening compound, in an air-tight iron box, and subjecting to high temperatures of from 1400 to 1500 degrees for about 4 hours; after which they are allowed to cool slowly, then unpacked, reheated to about 1300 degrees and quenched in water or oil, according to purpose for which they are intended. The case-hardening process is a very important one, as it contributes much to the life of the mechanism; and in the Stewart & Clark plant a very elaborate equipment and skilled workmen are provided for this work.

The main driving spindles and auxiliary shafts are produced in almost the same way except that the gear teeth and worms are cut on special hobbing machines, such as is

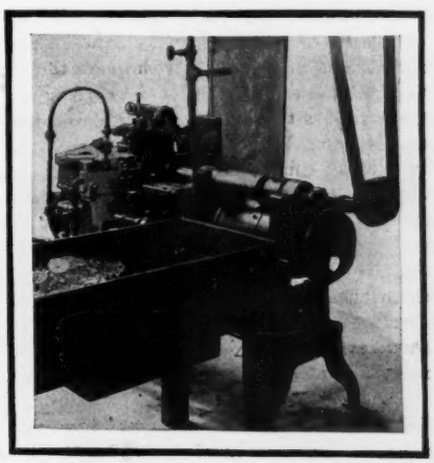


FIG. 11—DIE CASTING MACHINE
In Which the Skeletons for Speedometer and Odometer Are Formed from the Molten Metal.

FIG. 12—ASSEMBLING SPEEDOMETER MECHANISM INTO CASING

shown in Fig. 17. The brass sleeve which supports the main driving spindle, also is a product of the automatic, into which it goes in the form of a long rod; and comes out formed, bored and threaded.

One of the most important and interesting features of the speedometer, is the simple adjustable bracket T, Fig. 1, which supports the vertical shaft that has the indicating hand mounted on its upper end, and the aluminum cup secured midway between its two ends. This bracket is another die casting with holes and threads cast in; and it, too, is brass plated and laquered. The means provided for adjusting this bracket is illustrated in Fig. 13.

The Adjustable Feature

As shown, the bracket has two grooved guide rails G, which are designed to slide upon two guides L cast integrally with the skeleton cup. The guides also serve to hold the bracket in place. This bracket is held down by a screw, indicated by dotted lines; and a coil spring N tends to force the bracket upward. When this screw, whose head may be reached from the outside of the case, is turned in an anti-clockwise direction, or unscrewed, the bracket moves upward; and when the screw is turned in clockwise direction, it draws the bracket down. By raising the bracket, the cup is lifted out of the space between the magnet and field-piece of the rotor; and the magnetic drag upon it is thus reduced; whereas if the bracket is drawn down, the cup is lowered farther down in this space and the magnetic influence upon it increased. Thus, if it should be found in testing the speedometer, that at the rate of 10 miles per hour, the instrument registers 12, by unscrewing the adjusting screw slightly, the drag upon the aluminum cup would be decreased until the needle registered properly. On the other hand, if the indicator registered less than the proper speed, the screw could be turned in a clockwise direction, the bracket drawn down, and the magnetic drag on the cup increased until the indicator hand registered correctly.

The vertical shaft to which the aluminum cup and indicator hand are attached, is made from a fine steel rod; and is accurately machined and ground at the ends by the same processes used in manufacturing staffs for clocks. This shaft is mounted in two jewel bearings which are pressed into the supporting arms. The lower supporting arm is cast integrally with the bracket; while the upper arm is a brass stamping made from sheet brass in a punch press. The upper arm also has an extension depending diagonally downward, which has a hole in it for the attachment of the calibrating spring. This calibrating spring is very fine and thin; and resembles that of a watch. It serves to resist the magnetic drag upon the aluminum cup to whose center bushing its one end is secured.

The Aluminum Cup

The aluminum cup is blanked and formed in a punch press from thin sheet aluminum; then the cup is placed in a special lathe in which a centering tool is employed to pierce a hole in the center. This hole is for the brass bushing used to secure the cup to the

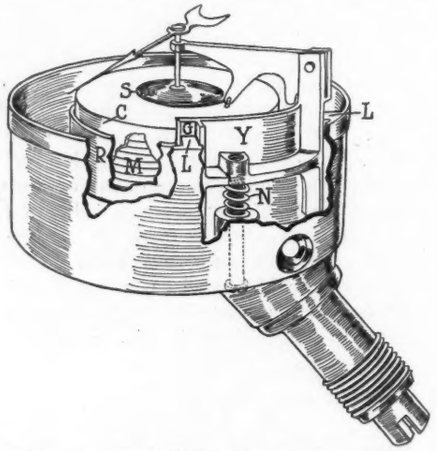


FIG. 13.—ILLUSTRATING THE ADJUSTMENT FEATURE

shaft; and it is important that the hole be absolutely centrally located, for the cup must be accurately balanced. The bushing is pressed into the cup, and it also is a press fit on the shaft. Special testing devices are employed to see that the aluminum cup turns true, and that the shaft is straight; other devices are employed to balance the cup; when a cup is found to be out of balance, a daub of fine cement properly applied is employed to balance it.

Both the calibrating or restraining spring, which is made from a high-quality clock-spring wire, and the dial, are purchased ready made by specialists in the manufacture of these features. The indicator hand, however, is made in the Stewart & Clark plant. It is punched from fine sheet steel, and obtains its blue color by heat treatment and the application of a bluing compound. The brass bushing for mounting and securing the indicator hand to the shaft is made from brass rod in an automatic screw machine. It has a tapered and slotted hole and is a force fit on the end of the shaft. It is applied with a hand tool.

The odometer, which is shown at M in Fig. 1, has the appearance of being a very complicated mechanism; but in reality it is quite simple both in construction as in operation.

The odometer driving mechanism and the driving cross shaft are formed of solid steel rod on the automatic screw machine, then the helical spur and worm gear teeth are cut on in special hobbing machines, after which they are case-hardened. The intermediate gears of the odometer driving mechanism are of steel and also case-hardened to insure durability.

Steel Bearings in Odometer

Steel bushings are provided for all bearings of the odometer driving mechanism and these are made on the automatic screw machines and pressed into the skeleton carrier. The skeleton carrier of the odometer, like that of the speedometer, is a die casting with all lugs, studs and carrying posts integral. Even the pins for holding the dial in the proper fixed position are cast thereon; and like the skeleton of the speedometer this part forms the base on which all the working mechanisms are mounted; it is brass-plated and lacquered for the purpose of insulation. Attention is called to all of the precautions exercised to insure the desired permanency of the magnet.

Practically all of the main driving gears of the odometer mechanism itself are of

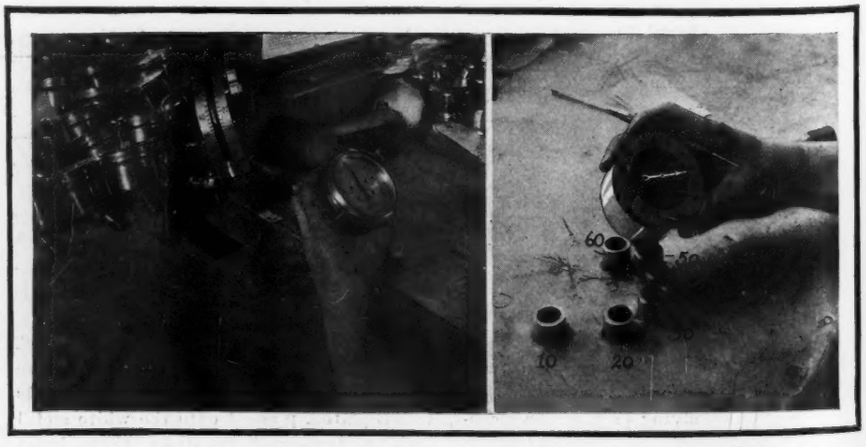


FIG. 14—TESTING AND CALIBRATING THE INSTRUMENT AT DIFFERENT SPEEDS

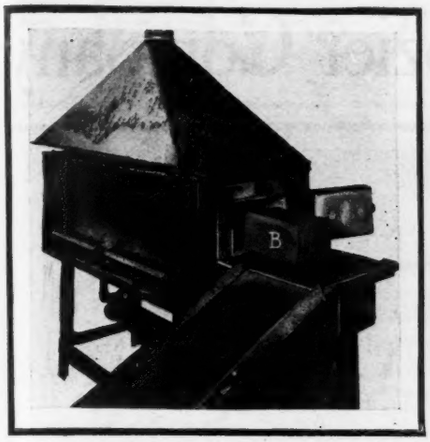


FIG. 15—A CASE-HARDENING FURNACE
Parts to be case-hardened are packed in the iron box B, which is sealed and ready to enter the gas furnace

hardened steel while the gears on the numbered recording disks are of brass, blanked and formed from the sheet metal in the punch presses. The smaller spur gears mounted on the auxiliary shaft, Fig. 1, are formed in the automatic screw machine from special fluted bar stock.

Numbering the Recording Disks

The recording disks with the numbers on them are made of celluloid cut from the rod on special automatic screw machines. Three disks are cut at a time and an attachment to the machine is used by means of which the figures are rolled into the celluloid and inked during the process of cutting. After inking, a cutting tool is run over the surface which removes the inked surfaces leaving ink only in the depressions. Each disk is made up of five pieces as shown in Fig. 16, comprising the numbered disk, the driving gear, the slotted blank, the two-tooth blank and the bushing which passes through the center and rivets the component parts together. A clever feature of these disks is that of the bushing just mentioned. In order that they may have a secure fit on the shafts or spindles to which they are attached, both the bushings and the spindles are knurled and the bushings are pressed onto the spindle. The trip-shifting lever L, Fig. 1, is of steel, blanked, formed and pierced at one operation. The pivot pin for this lever also is of steel, case-hardened.

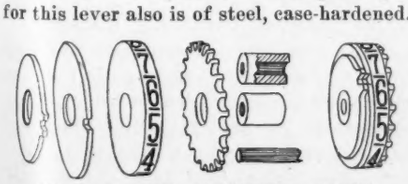


FIG. 16—THE ODOMETER DISKS
Dis-assembled and assembled, also section of bushing with fluted bore and piece of fluted shafting

The push button U, which is mounted in the case and which operates this lever from the exterior is cut and formed from brass in an automatic. The same process is used to make the large knurled button N, which operates the odometer trip mechanism.

The dash bracket that supports the entire mechanism also is blanked, formed and pierced on a punch press, then it is polished and lacquered to prevent tarnishing.

In making the flexible shaft the core or driving chain is made from steel wire in a special wire-forming machine, the ends being brought together with just enough space to permit hooking the links together when held in a certain position. After the links are formed they are case-hardened.

The Flexible Shaft

The driving chain is inclosed in a flexible casing which is comprised of two layers, an inner one of steel and an outer one of brass. The inner casing is formed of three-quarters round steel wire wound with the flat surface inside so as to make a smooth bearing for the chain. The outer casing is made from triangular brass wire wound over the sheet wire as illustrated in section in Fig. 18 with one edge forced between the interstices of the inner steel casing. When this outer casing is applied pressure is used which causes the converging surfaces of the brass wire to conform to the curved surfaces of the inner steel wire. Brass ferrules are placed on the ends of

FIG. 17— A HOBBING MACHINE
Which cuts spiral gear teeth on the spindle S of speedometer mechanism

the tube or casing thus formed and crimped into place; to these ferrules are attached the unions by means of which the tube is locked to the instrument at one end and secured to the swivel joint at the other end. The instrument end of the chain has a tongue which fits into a slot in the end of the driving shaft. This collar has a bearing surface in the ferrules. The swivel joint end of the chain has a sliding tongue joint to take up slack in the chain.

Lack of space will not permit of a detailed description of the swivel joint, but suffice it to say that it is made of drop forgings and hardened steel and the pieces are machined in the automatic screw machine or special hobbing machines which facilitate rapid and accurate construction.

Sprocket gears generally are made from malleable pressed steel blanks and in cutting the teeth on them twenty-five gears are placed in a hobbing machine and cut at one time. After this the gears are brass-plated and lacquered to prevent rusting in service. The company makes 155 different kinds of gears which require a different

FIG. 18—SECTION OF FLEXIBLE TUBE
The driving chain is made of hardened steel links; the inner casing is made of half-round steel wire; and the outer casing consists of triangular brass wire

pitch, a different number of teeth, different inside bores and some a different number of bolt holes. The only feature of the set of gears in which all are alike in every respect is that of the method of construction, the materials employed and the fact that all pinions have sixteen teeth.

The company makes a small number of various types of brackets for attachment of the swivel joint to the axle, but it also has a standard form of clamp which is applicable to 90 per cent of the different makes of cars. The standard clamp is comprised of three pieces, the upright, the swivel block and the arm and link. It is made for the most part from malleable, machined in the automatics, and brass plated and lacquered.

Principle of Odometer

The principle of the odometer is very simple indeed. There are ten figures or numbers on each disk; and the disks are so geared that when one disk makes one complete revolution it turns up one number on the next disk to the left of it. As shown in Fig. 1, there are three disks at the right apart from the five at the left. Those at the right register in tenths, units and tens; and the five at the left in units, tens, hundreds, thousands and tens of thousands. Thus the three disks at the right, which register for each trip, indicate the distance up to 100 miles; and the five disks at the left indicate mileage from 1 to 100,000. The former, therefore, is known as the trip odometer, and the latter the season odometer.

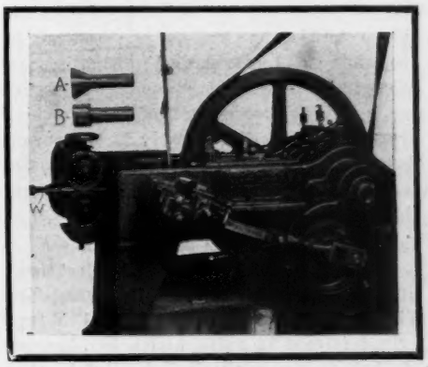


FIG. 19—A HEADING MACHINE
Into which is fed a wire W to form the bolt or headed pin B

Many Changes Made by Lozier Company

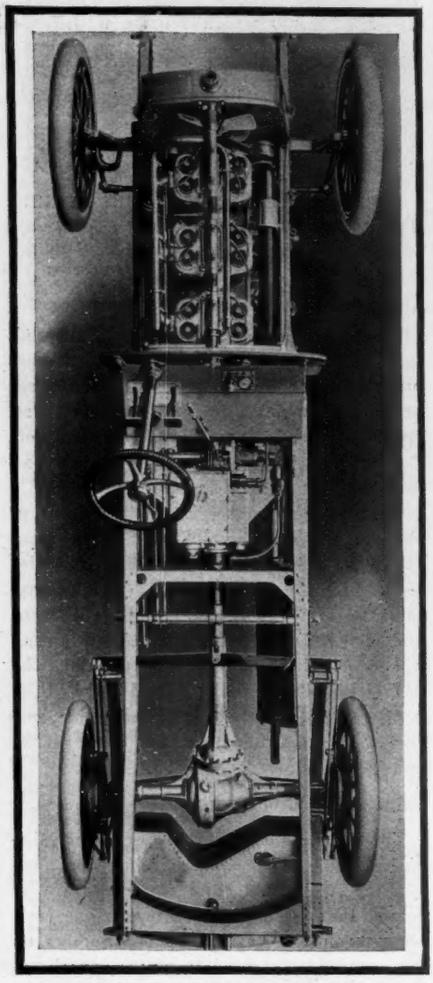


FIG. 1—PLAN OF CHASSIS

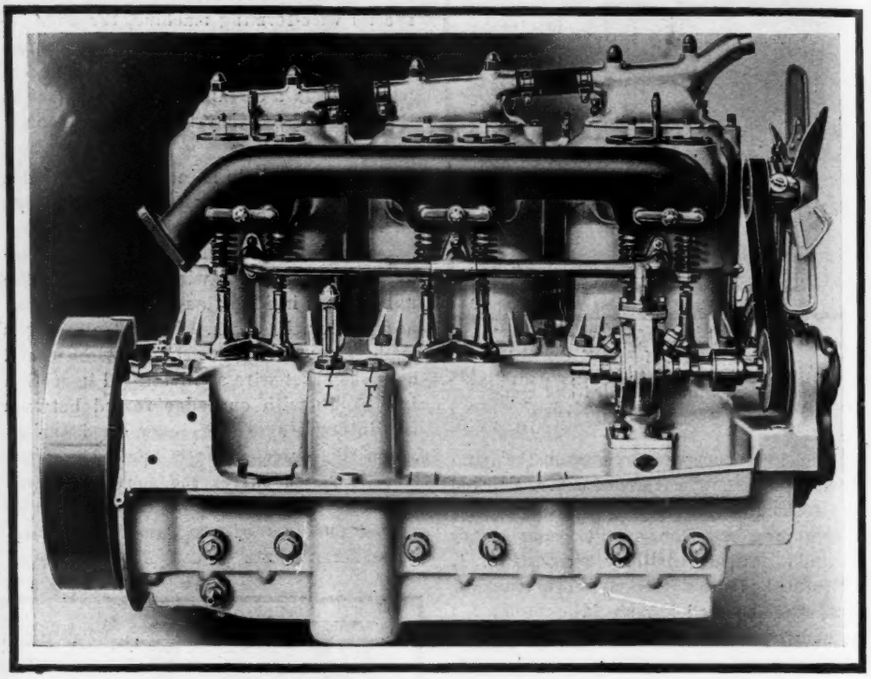


FIG. 2—RIGHT SIDE OF NEW LOZIER MOTOR

Steering Wheel on Left-Hand Side—Emergency Brake and Speed-Changing Levers Centrally Located—New Oiling System and Multi-Point Ignition Adopted

FOR the first time since 1908 the Lozier Motor Co., Detroit, Mich., is producing a car which in the strictest sense of the word can be called a new model.

This new model is designated type 72, and will be on the market for the season of 1913. It differs radically from previous Lozier models in that the steering wheel is on the left-hand side of the car; the emergency brake and speed-changing levers are centrally located; a circulating automatic splash lubrication system is employed in the motor; and multi-point ignition is used. There also exists throughout the entire car a general refinement of detail which promises to add considerably to the power, durability, ease of operation and maintenance, and to the smoothness of operation.

Lozier Characteristics Maintained

The new model, however, has lost none of the well known Lozier characteristics. The motor has six water-cooled T-type cylinders cast in pairs, and a ball-bearing crankshaft; a multiple-disk clutch that runs in oil; a transmission or change-speed gearset of the sliding-gear selective type, which is located amidships and gives four forward speeds; and a propeller shaft enclosed in a torsion tube that transmits power from the gearset to a full-floating rear axle. The front axle is an I-beam drop-forging; the frame is made of pressed chrome nickel steel; and it is mounted on semi-elliptic front springs, and three-quarter platform rear ones. Wheels are equipped with 36 by 4½-inch front, and 37 by 5-inch rear tires; and the wheelbase is 131 inches. Continental demountable rims are used on the wheels, and they are so designed that both front and rear-wheel rims are interchangeable.

A very fair idea of the construction and design of the new model may be obtained from a description of the various refinements to be found in the different features of the car. In the motor, for instance, more power is obtained by virtue of larger valves, the new multi-spark ignition, the new improved carbureter and larger exhaust manifold. The valves have been enlarged from 1 15-16 to 2 inches in diameter, the angle of the seats is changed from about 45 to 30 degrees, and the valve seats are narrower, giving a total increased effective valve opening of 12 per cent. The narrowing of the valve seats also makes for a tighter valve because there is less surface for the possible accumulations of carbon deposit. The heads of the valves also are slightly heavier to prevent warping from the heat, and the valve spring seats have been lengthened to give greater seating surface on the valve stem. The change of the steering gear from the right to the left-hand side of the car has made it practicable to change the exhaust valves of the motor from the left to the right-hand side so that the carbureter and magneto are on the same side of the car as the steering mechanism. This makes possible the use of short direct-control connections between the steering column and these features.

Valve Chambers Completely Machined

Valve chambers are completely machined to prevent accumulations of carbon, and to obtain equal compression in all cylinders and smooth gas passages, all of which add to the smooth-running quality of the motor. The valve caps also are slightly changed and rendered tighter by placing the gaskets at the bottom of the seat.

An interesting feature of the new Lozier motor is the air pump used for maintaining pressure in the fuel tank. This pump is located at P, Fig. 3, and is incorporated in one of the valve-lifters as shown. In operation, when the valve-lifter descends air is drawn from the crankcase into the space above the lifter through a ball check valve; and when the valve-lifter raises

In Its Type 72 Six-Cylinder 1913 Model

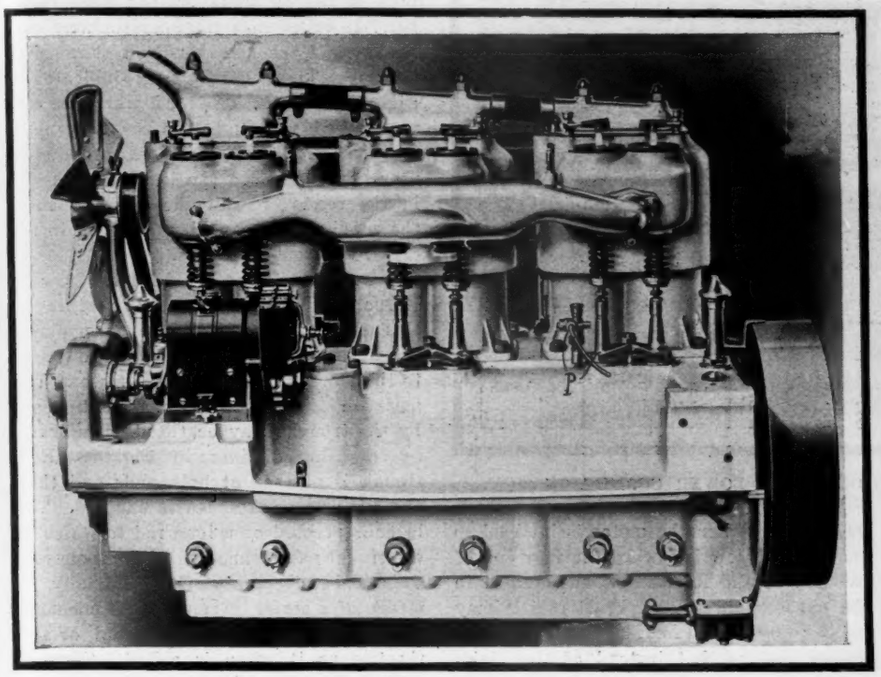


FIG. 3—LEFT SIDE OF NEW LOZIER MOTOR

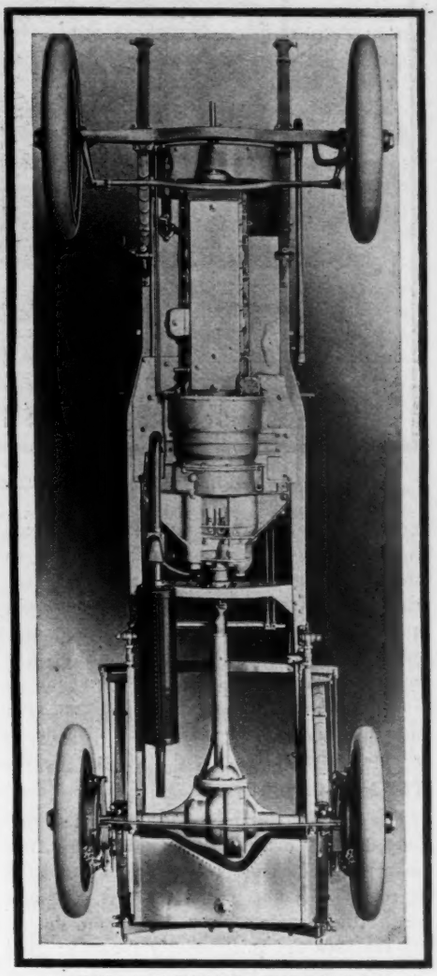


FIG. 4—CHASSIS, UNDER SIDE

For First Time Since 1908 Big Detroit Concern Puts Out a Car That Incorporates Radical Departures from Its Usual Practice—Many Detail Refinements

this air is forced through another check valve arranged in a mechanism at the side of the valve-lifter and forced into a lead or tube communicating with the gasoline tank. The pressure is regulated by means of a blowoff valve at the top of the check valve mechanism arranged at the side of the valve lifter; and a separate lead from the gasoline supply tank communicates with a gauge on the dash to indicate the pressure maintained therein.

Multi-Point Ignition Employed

Considerable change is to be found in the ignition system. A new double distributor Bosch dual magneto is fitted which gives two sparks at a time in each cylinder when desired, and which has a dual circuit-breaker that permits of the use of a battery to facilitate starting. The magneto also has been raised into a more accessible position and moved forward away from the carbureter. Two sets of plugs are employed in this system, one over the inlet valves and the other over the exhaust valves. The plugs in the inlet valve chambers are used in connection with the battery current for starting; and provisions are made for running the car on the magneto with only this set of plugs in operation.

In the cooling system the design of water pump is changed so that the water enters on both sides of the rotor; this eliminates end thrust of the rotor hub, which prevents wear and reduces the power consumed in driving the pump. The pump also has been moved forward to make room for subsequent attachment of a lighting dynamo behind it; and special pads have been cast in the horizontal web of the crankcase for the attachment of a device of this character. The change in the location of the water pump, of course, has required that a small change be made in the inlet water manifold, the joint between the vertical with the horizontal portion of the manifold now being nearer the forward end than in the center; the holes in each cylinder connection are graduated in size, however, so that each pair of cylinders may receive the same amount of water.

Improvement is to be found in the waterjacket covers in that they are of neater and simpler design, and give a smoother water passage. Each cover is held by but two large studs centrally located, instead of being secured by a series of small ones arranged around the edge of the cover.

The fan-belt now is made with a leather face and canvas back instead of all leather, which gives a more durable construction; and to facilitate replacement a new design of telescoping coupling has been devised which permits quick and easy replacement of a new endless belt whenever necessary. The mechanism for maintaining the proper tension of the belt remains unchanged, but the fan itself is 1½ inches larger in diameter. Greater cooling efficiency also is obtained by enlarging the radiator, it having been increased 1½ inch in height and ½ inch in thickness.

Crankcase Completely Redesigned

Needless to say, the rearrangement of the water pump and magneto, the installation of a new oiling system, etc., have affected the design of the cast aluminum crankcase; but in addition to these changes the case nas been made heavier and stronger throughout. An important improvement is obtained by moulding into the upper half of the case steel castings for the support of each main bearing. These castings carry the studs for the cylinders and for the main-bearing caps. Thus, the crankshaft practically is secured directly to the cylinders. The advantages of this construction are great additional strength and reduced vibration.

The front cover to the engine gearcase

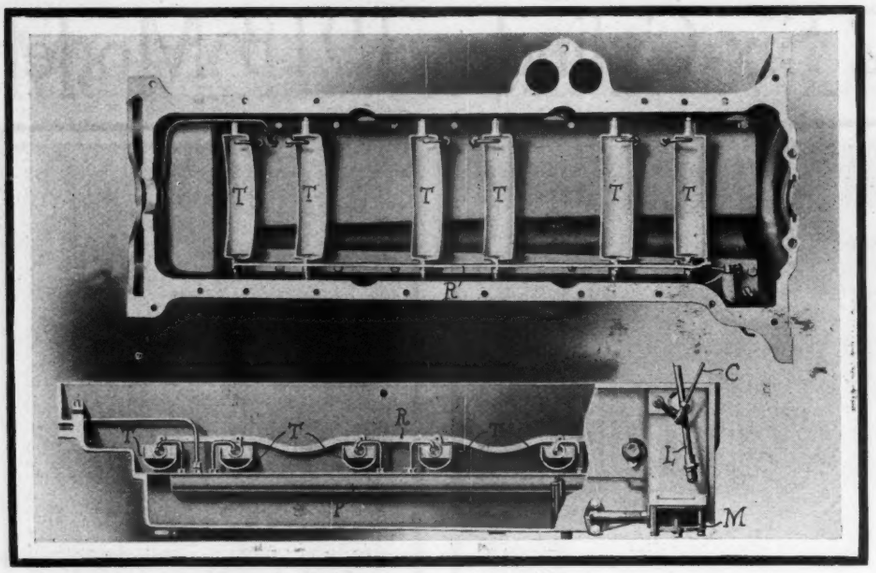


FIG. 5—PLAN AND SIDE SECTION OF LOZIER LOWER CRANKCASE

now is provided with annular ball bearings for the magneto and pump shafts, so that these gears now are more substantially mounted. This gives increased quiet in the operation of the gears, and promotes durability. Lubrication of the engine gears also is improved by means of an oil lead that enters the lower rear portion of the case, and directs a stream of oil upon the gears.

The New Oiling System

Because of the new oiling system employed the lower half of the case has been changed completely. This lower half is removable, and with it almost the entire oiling system may be taken down. Its features are quite clearly shown in Fig. 5. It is divided horizontally by a pressed steel partition P, which is designed to catch the oil that overflows from the splash or scoop troughs T and drain it into a sediment chamber at the rear end of the case. This sediment chamber has for its forward wall a vertical partition that extends across the lowermost portion of the case.

This partition forms a dam over which the oil flows when the sediment chamber is full. The oil which flows over dam drops into a similar chamber known as a suction chamber. From this compartment the oil is drawn for recirculation. The construction of this section is interesting in that it contains the screens for cleaning or straining the oil, and a valve arrangement in the front partition that insures an oil supply when the motor is descending hills. There are two strainers in the compartment through which the oil must pass before entering the pump, one very large one that arches over almost the entire chamber, and a smaller cylindrical one that is attached to the end of the oil intake pipe. The front partition of the suction chamber is a high one, and in the center of it is pivoted a gate valve comprised of a round disk V, Fig. 6, that covers a hole at the bottom of the partition. This valve opens when the motor is inclined so that the oil flow is toward the rear end of the motor; and it closes when inclined in the opposite direction. From this it may be seen by those familiar with previous Lozier designs that instead of the plain, forcefeed splash lubrication system employed heretofore, a circulating splash trough system now is used; and in operation the oil circulation is as follows:

Primarily the main oil supply is contained in a large reservoir occupying the greater portion of the lower part of the crankcase. This reservoir is in communi-

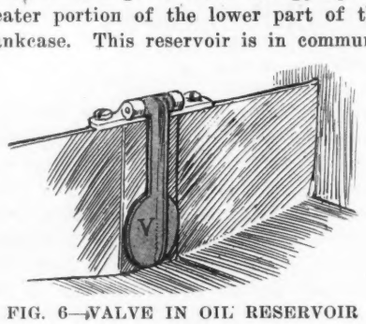


FIG. 6—VALVE IN OIL RESERVOIR

cation with a suction chamber arranged near the rear end of the case as stated above. Oil is drawn from this suction chamber by a gear pump located at the left rear corner of the lower half of the crankcase and after passing through a sight feed or indicator mechanism on the dash is forced through a large internal copper tube from which there are short leads or pipes that conduct streams of oil into each of the scoop troughs T. There also is a lead near the front end that feeds a stream of oil onto the engine gear teeth. The oil in the troughs is caught up by scoops on the end of the connecting rods and thrown on to practically all of the internal mechanisms of the motor. That which drains down to the bottom of the case and overflows from the trough drains back into the sediment chamber as above described.

There is a drain plug in the sediment chamber which permits the dirt collecting in the bottom thereof to be drained out with the oil contained therein. Thus the dirty oil is removed without losing the bulk of the oil supply in the main chamber. In order that the operator may conveniently learn how much oil there is in the motor reservoir a float indicator I, Fig. 2, has been provided which is conveniently arranged beside the filler opening F. With this arrangement the operator can easily see the height of the oil in the reservoir while he is replenishing the supply. The capacity of the main reservoir is about 4 gallons.

Oil-Level Automatically Adjusted

One of the most important features of this oiling system is the means employed for automatically adjusting the oil level to the power demanded of the motor. This means consists of an arrangement whereby the troughs may be tilted as indicated by the dotted lines in Fig. 7. Each trough is pivoted at both ends and there is a little lever attached to one end. This lever is pivoted on a long rod to which all the troughs are connected in the same way. This rod is operated longitudinally by means of a series of connections communicating with the accelerator pedal, or foot throttle as it often is called. Thus, as the throttle is opened, in order that the motor may develop more power the troughs which ordinarily would occupy a tilted position are straightened up and the depth of the oil in them increased. Thus the supply is automatically increased according to the demands of the motor and decreased when not needed, so that smoking is eliminated and carbonization of the valves is reduced to a minimum.

Other Minor Motor Changes

Among other changes to be found in the new motor the exhaust manifold has been increased in diameter; cylinder flange bosses are re-enforced by two webs each; the crankshaft has been enlarged; and better materials have been found and are employed wherever possible. The camshafts now are of chrome nickel steel, heat-treated, instead of plain carbon steel, which makes them more durable and less liable to crystallization. The crankshaft has been increased ¼ inch in diameter, having been enlarged from 1⅞ to 2⅛ inches; and the webs or cheeks of the crankshaft also are strengthened, being ⅛ inch thicker. Larger ball-bearings also have been provided for carrying the crankshaft.

Pistons and connecting rods remain unchanged except that the bearing surface

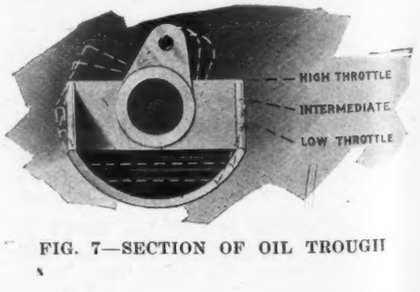


FIG. 7—SECTION OF OIL TROUGH

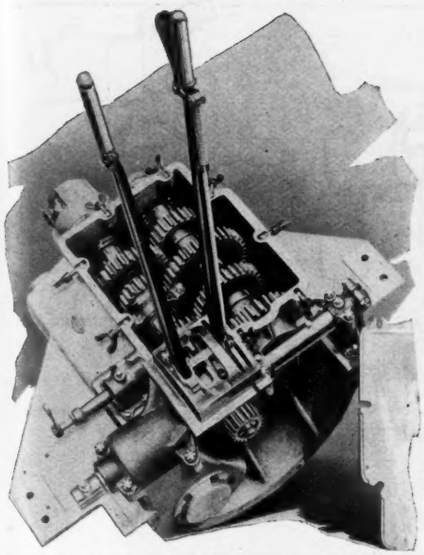


FIG. 8—LOZIER TRANSMISSION GEARSET

at the lower end of the rods has been increased to fit the larger diameter crankshaft. An interesting feature of the Lozier pistons is the method of arranging two ¼-inch piston rings in each ½-inch groove with their diagonal slots inclined in opposite directions. Each piston has four of these eccentric rings arranged above the piston pin. The connecting rods have a bronze bushing for the piston pin bearing and a slight change is to be found in the bearings used at the lower ends, these having been changed from die-cast Parsons white bronze to a bronze shell lined with anti-friction metal.

Rayfield Carbureter Used

The new carbureter used on the Lozier cars for 1913 is a special Rayfield design which has an auxiliary butterfly valve in the hot air intake pipe that may be operated by a lever on the dash to facilitate starting. There also is a special gasoline strainer incorporated in the carbureter which eliminates the necessity of the filter previously employed in the gasoline line. This strainer includes a sediment chamber for the elimination of water and dirt.

Passing from the motor to the clutch, hardened and ground steel keys now are employed to engage the clutch disks instead of having lugs integral with the periphery of the disks. This provides hard surfaces of contact for the disks, reduces their tendency to drag and wear, and makes for smoother operation. The trunnion ring, or shifting collar, of the clutch now is a steel stamping instead of a drop forging and it has a self aligning double thrust ball bearing instead of a plain single row ball thrust bearing. The design of the clutch brake has been improved so that about 30 per cent greater wearing surface is obtained. Better lubrication of the clutch bearings has been provided by perforating the clutch hub.

In the gearset the case has been adapted to carry the change-speed and emergency brake levers and the quadrants on which they operate instead of having these features mounted on the main frame. An intermediate bearing has been provided for the main shaft, producing increased rigidity and thereby reducing gear noises to a minimum. The constant-mesh gears now are of a coarser pitch to make them more quiet, and stronger as well. A notable feature is that of a clutch, cut on the rear end of the countershaft of the transmission gearset, for attachment of a tire pump which may be carried on the cross member that supports the rear end of the transmission gearset.

Propeller Shaft Improvements

In the propeller shaft three noteworthy changes are to be found—first, the shaft has been strengthened by the use of an electric chrome vanadium steel instead of nickel steel; second, the rear end bearings have been rendered more efficient by placing the radial ball bearing directly behind the driving pinion, and mounting a new self-aligning thrust bearing in front of it; third, a new self-adjusting stuffing box has been provided at the front end of the propeller shaft to keep grease contained in the universal joint from running down into the axle casing.

Three standard gear ratios are provided for in the Lozier rear axle. The rear axle is ordinarily designed so that pinions and gears may be fitted that will give either a 3 to 1, 3¼ to 1 or 3.6 to 1 ratio.

In the rear axle practically the same changes have been made in the driving shafts as in the propeller shaft and the differential pinions have been changed from a carbon to a more durable nickel steel. A stronger and lighter differential carrier also has been obtained by making it from a drop forging instead of a steel casting. The rear wheel hubs have been provided with self-adjusting stuffing boxes to prevent grease from getting out on the brakes; brakes are provided with easier means of adjustment from the rear end of the car. A larger hand wheel is fitted to the outer or service brake; and a self-locking turn-buckle is provided on the connecting link of the emergency brake. Means for releasing the service brake have been improved so as to prevent dragging, which consists of a plunger and spring arranged to keep the upper half of the brake-band off the drum.

The front axle now is fitted with Timken roller bearings instead of adjustable cup and cone ball bearings for the wheel hubs, the knuckle pivot bolts are increased from ¾ to ⅞ inch in diameter, and the bushings have been lengthened so that greater bearing surface and increased strength is obtained. The left-hand steering, of course, has resulted in a change of the knuckles, and to conform with the general increase in strength, striven for throughout the car, they have been enlarged ⅛ inch in diameter and are made from chrome vanadium instead of nickel steel. The I-beam drop forging also has been changed from nickel to chrome nickel, a change which has affected quite a reduction in weight. The springs that support the chassis frame are a trifle heavier and slightly more arched; and the spring bolts now are made from chrome nickel instead of carbon steel.

Aside from changing the steering gear from the right to the left side of the car, it has been redesigned so that the spark and throttle control levers can be removed without disturbing their gears at the bottom; and the material in the worm-and-gear has been changed from 3½ to 5 per cent nickel to make them tougher and harder.

The New Body Styles

Two new body styles have been added to the line so that it now includes the Larchmont, a five-passenger close-coupled straight line design; the Meadowbrook, a racy two-passenger runabout; and the Lakewood, a five-passenger torpedo style with an extra seat incorporated in the left tonneau door, which practically makes it

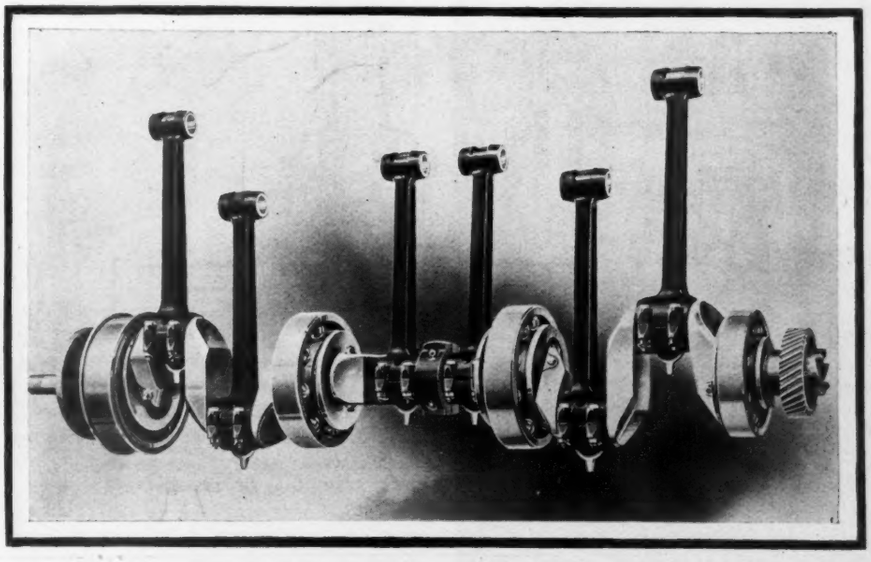


FIG. 9—THE LOZIER BALL BEARING CRANKSHAFT ASSEMBLY

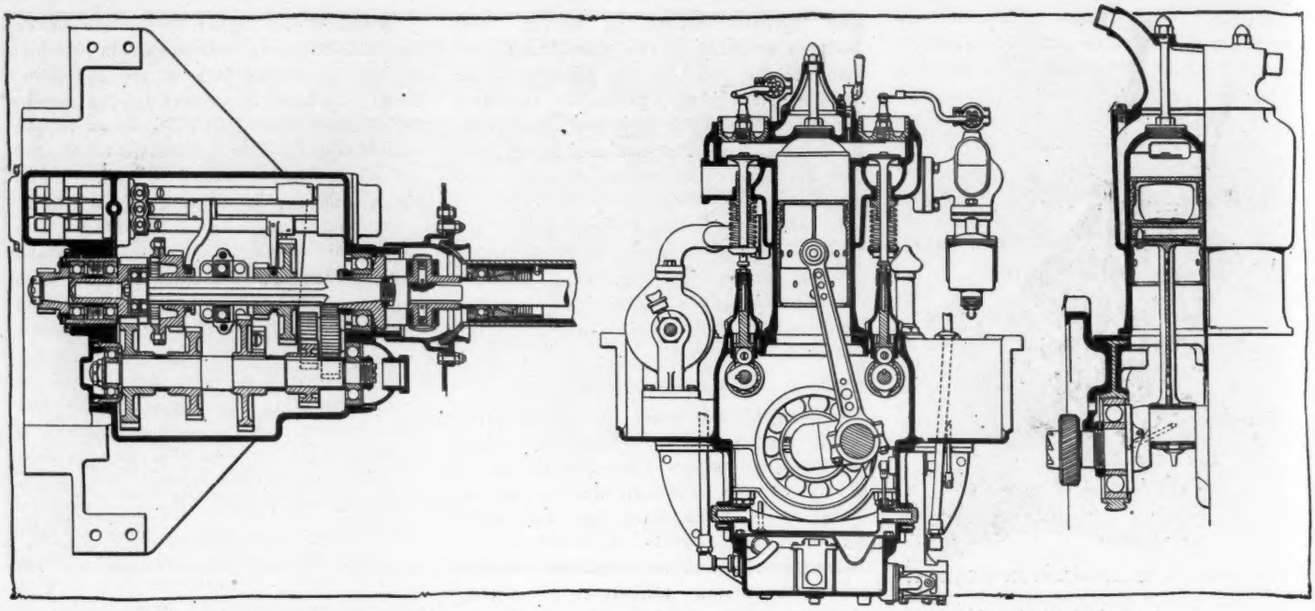


FIG. 10—SECTIONAL VIEWS OF NEW LOZIER MOTOR AND TRANSMISSION GEARSET

a six-passenger vehicle, has been continued. The extra seat folds in out of sight when not in use, but at the same time is very secure and comfortable when arranged for occupancy. The Riverside, a seven-passenger touring car, and the Knickerbocker, foredoor limousine type, complete the line.

Acetylene Tank Concealed

A new suspension for the acetylene tank is provided in the new car, a hole having been cut in the running board which conforms to the shape of the tank. So the tank now is located directly under the tool box, the bottom of which is concave. Thus the tank is suspended partially above and partially below the running board; and rests in a pan hinged to the under side of the running board. The tank is readily removable after releasing a catch that secures the pan in place; and cover plates at the ends of the tool box give easy access to valves or gauge at opposite ends of the tank. On

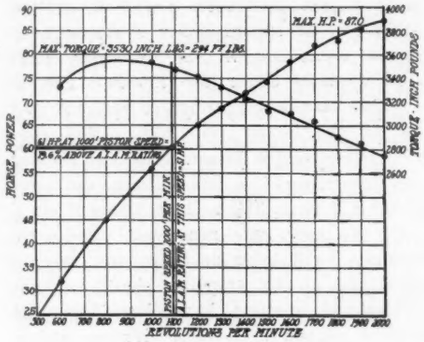


FIG. 11—LOZIER HORSEPOWER CHART

Diagram of test made February 27 on the new type 72 motor which has: Six cylinders; 4⅝-inch bore; 5½ inch stroke; 534.4 cubic inches total displacement; maximum foot pounds torque per cubic inch displacement, .531; maximum horsepower per cubic inch displacement, .157. The pistons, compression, valves, cams, manifolds, carbureters and magneto, all were the standard Lozier construction described.

the Lakewood and Briercliff models, which do not carry tool boxes on the running board, a neat aluminum case is provided for the tank above the running board.

Lakewood and Riverside Models

The Lakewood body design differs from the Riverside in several other respects besides that above mentioned. It is a straight-line flush-sided type resembling more of a torpedo pattern. The front seat is farther back from the dash, there is more rake to the steering gear and a different shaped toeboard is employed. On the left side of the body a foot rest is provided for the extra passenger.

It is interesting to note that with cylinders 4⅝ by 5½ inches, the motor has an A. L. A. M. rating of 51 horsepower, and as per the diagram shown herewith, the motor actually develops more than 80 brake horsepower. Fifty-eight sets of ball bearings are employed in the Lozier car.

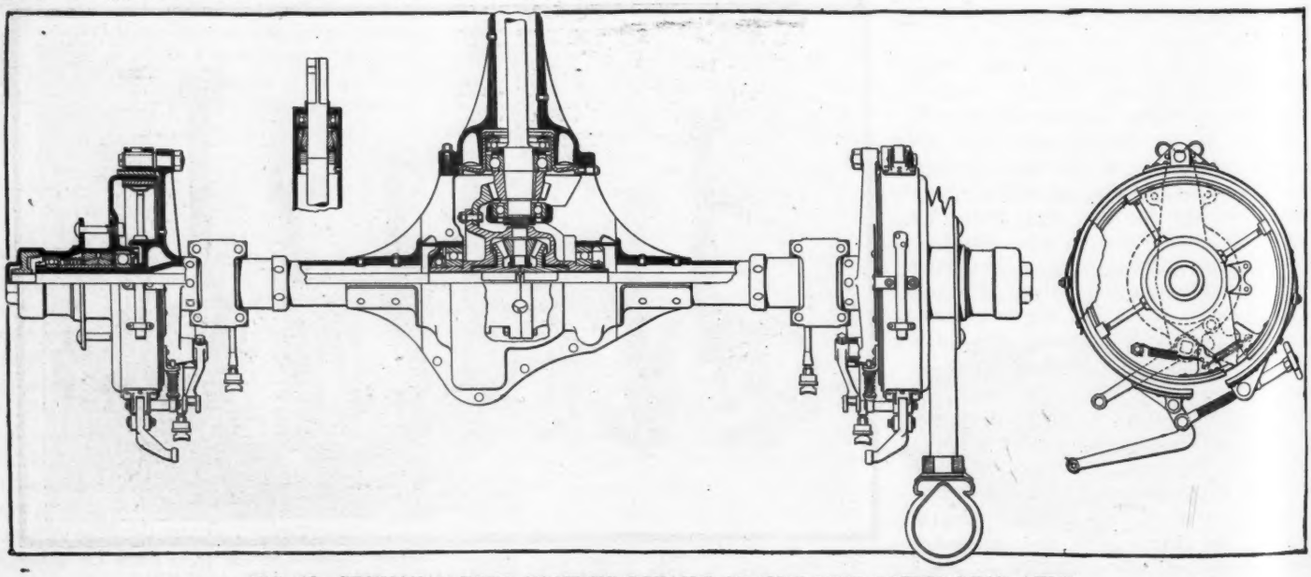


FIG. 12—SECTIONAL VIEW SHOWING DETAILS OF IMPROVED LOZIER REAR AXLE

Motor Car Repair Shop

Adjusting Bevel Gear

Cause, Effect and Remedies for Rear Axle Noises

THE driver of a motor car often becomes worried by a whirring noise which develops in the rear axle. This whirring noise is due to two causes: First, it may arise be-

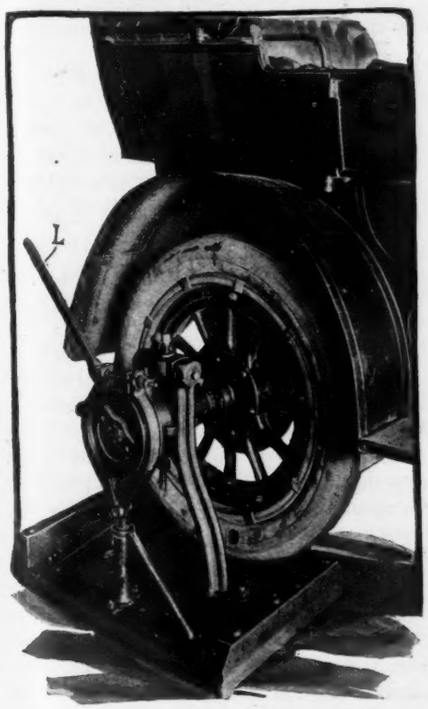


FIG. 1—THE BRAKING MECHANISM

cause of a lack of lubricating oil in the rear axle gearcase. Second, it may originate from a lack of proper adjustment between the driving pinion and the large bevel gear with which it meshes. Obviously, the cure for the first case is simply a replenishment of the lubricant contained in the case. The remedy for the second cause, however, is not so simple. Lack of adjustment between the driving gear may be due either to wear of the teeth or improper meshing of the gears. When the teeth are worn the best remedy to obtain silence is to have a new set of gears fitted. The next best remedy is to mix flake graphite with the lubricant contained in the gearcase and keep the case as full as possible of the lubricant without causing it to leak out onto the brake bands. When the gears are simply out of adjustment, means generally are provided for moving the pinion into proper mesh with the large bevel driving gear and by adjusting this pinion silence generally can be obtained.

In Fig. 1 is shown a special mechanism in use in the Studebaker repair shop, Chicago, to facilitate the adjustment of the rear axle driving gears. This mechanism consists of an extra long shaft, to replace the regular driving shaft on one side of the axle; and a brake mechanism by means of which a strain may be put upon the drive shaft by operating the hand lever L. As shown in this illustration, two workmen are required to adjust the gears, because the body is not removed from the chassis of the car. One man must operate the brake, and another must adjust the bearing collar of the driving pinion. When the body is removed from the car, a single workman can adjust the pinion and operate the braking device at the same time, as indicated in Fig. 2. The motor is running, the transmission is set for high speed and in operation. The off-side wheel rests on the floor, and there is no connection between the driving shaft and the near wheel. It has been found that the adjustment of the driving gears is most correct when they operate most noiselessly, thus the operator simply applies the brake with the left hand and changes the adjustment with a wrench in

FIG. 2—ADJUSTING BEVEL GEARS

the right hand until the most quiet operation is obtained.

Another cause of rear axle noise which was neglected above is that which arises when the bearings which support the driving pinion are worn or out of adjustment. This also will throw the driving pinion out of proper mesh with the large bevel driving gear. It is very necessary that the adjustment of these driving gears be as carefully maintained as possible in order to reduce wear and avoid the noise above mentioned.

An Unusual Lathe Job

Motor Crankshaft Turned off Without Dis-assembling

IN Fig. 3 is shown an interesting view recently taken in the General Motors Truck Co.'s repair shop, Chicago. It shows a motor mounted between the centers of the lathe with a portable crane used to relieve the centers of much of the weight of the motor while an operation is being performed on the tail of the crankshaft. It was necessary that the motor, whose flywheel was designed for a Hele-Shaw clutch, should be fitted into a car or chassis designed for a cone clutch. To obtain a motor suitable for this chassis would have required either a new motor and a delay of about 2 weeks' time, or demanded the change that was made in the motor on hand so that it would be adaptable for the attachment of a cone clutch.

This of course necessitated the use of a new flywheel and the turning down and cutting off of the tail of the crankshaft to fit it. Had it been necessary to take the crankshaft out of the motor to perform this operation at least a day's time would have been wasted. But, as illustrated, only the flywheel of the motor was taken off, then it was hoisted into position by the portable crane C, adjusted between the centers of the lathe and the tail S of the shaft turned up to the required size. The lathe has a 14-inch swing and the lathe dog was secured to the forward end of the crankshaft to operate it during the turning operation. This also illustrates one of the advantages of the portable crane C.

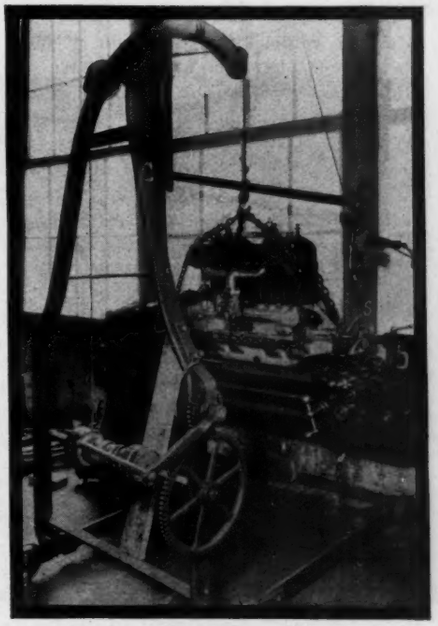
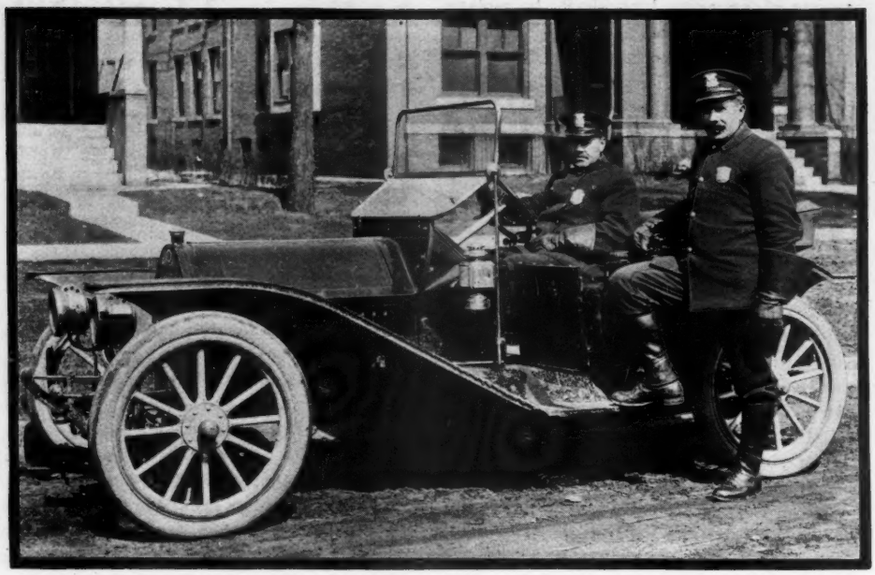


FIG. 3—MOTOR IN THE LATHE

From the Four Winds



REGAL USED BY DETROIT POLICE TO CATCH SCORCHERS

BALK at Mississippi Tax—The constitutionality of the new motor tax in Mississippi is to be tested. A number of owners have retained the former attorney general of the state, James R. McDowell, and action is to be brought at once.

Louisville Has New President—Dr. Henry E. Tuley has been unanimously elected president of the Louisville Automobile Club, of Louisville, Ky. General W. B. Haldeman was re-elected first vice-president. Rush C. Watkins was chosen as second vice-president. Walter Kohn was elected treasurer and Dr. R. R. Elmore secretary.

Meriden to Revive Hill-Climb—The Meriden Automobile Association, of Meriden, Conn., has planned to revive the hill-climbs which the organization held in the past on Ives hill. It is proposed to have two classes, one for fully equipped cars and the other for stripped chassis, and to limit the events to amateurs. Arrangements for a parade of cars and trucks by the local dealers preceding the climb are being made. The date has not been set.

Reciprocity Clause Weak—New Jersey motorists may now tour in Massachusetts without fear of prosecution by officials of the Bay state. The Massachusetts highway commission secured a copy of the New Jersey law and after going over its provisions and finding that the Bay state motorists could tour in New Jersey promptly passed a regulation raising the ban against the Jersey tourists that has been in effect for a couple of years. However, while Massachusetts motorists may tour 15 days in New Jersey the motorists from that state are allowed only 10 days' touring in any one year in the Bay state, which shows the need of an adequate reciprocity clause for all states.

Club for Drivers—The Automobile Drivers' Club, of St. Louis, has leased for 5 years the Washington Theater building, located at Kingshighway and Delmar avenue, and will alter it into a club house with gymnasium, shower baths, etc. This club has a membership of about 400.

Wisconsin's Count—On April 10, 1912, 13,510 motor cars had been licensed in Wisconsin for the year. It is estimated that this number will be doubled before July 1. Under the new Wisconsin law cars must be licensed annually and the fee is $5 per car, as compared with a fee of $2 and perennial licenses heretofore.

Wrangle Over Route—A dispute in Hancock county, Ill., over the routing of the Waubonsie trail has been amicably adjusted by E. O. Barstow, secretary of the Illinois Trail Association. The route was changed through Durham township in order to accommodate a large number of farmers who had agreed to assist in improving the road. The feeling engendered was regarded as a healthy sign, the competition ensuring better highways.

St. Louis Offers a Route—The St. Louis Automobile Club has proposed a route for this year's A. A. A. tour which will cover the entire Mississippi valley, starting from Minneapolis and finishing at New Orleans, with St. Louis the central point on the tour. The club is preparing to furnish mileage and other data and it is hoped in St. Louis that this tour will be selected. It will give a route of about 2,000 miles that can be made in 2 weeks, as the roads are fairly good. If this route is chosen the tour will probably be known as the Mississippi valley tour.

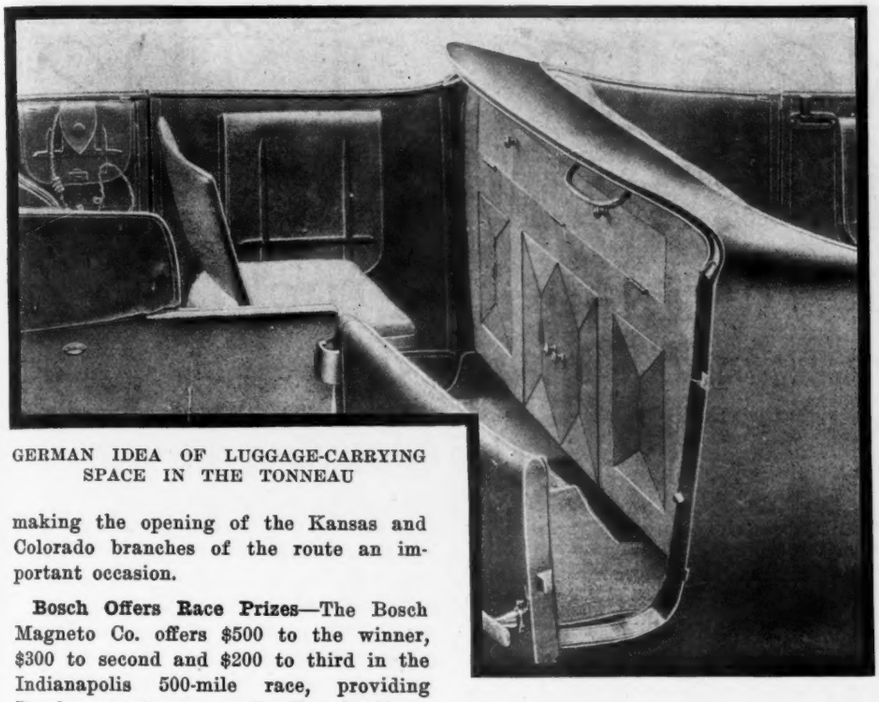
Senator for President—The Moorhead Automobile Club, of Moorhead, Minn., has been formed. Senator Charles S. Marden is temporary president and George L. Walker acting secretary. Ten dollars will include the membership fees and first year dues.

Encouraging Motorists—The Roswell Automobile Club, of Roswell, N. M., which has about 100 members, is waging a good roads campaign. The board of county commissioners agrees to expend dollar for dollar on road improvements whatever sum may be raised for the purpose by the club.

Stevens-Duryea Erects Signs—In an endeavor to warn motorists of the bad conditions of the roads between Chicopee Falls and Springfield, Mass., where cars are occasionally stalled in the mire in the spring time, the Stevens-Duryea Co. has had painted some big signs and posted them at intersections where they direct motorists how to find better roads to get to the residential section of Springfield without danger of getting stuck in the mud.

Portland Club Election—At a meeting of the Portland Automobile Club, of Portland, Ore., the entire 1911-1912 directorate of the club was re-elected. The directors are: W. J. Clemens, president; T. Irving Potter, Oliver K. Jaffery, George Knight Clark, H. L. Keats, Frank C. Riggs, John S. Beall, Howard M. Covey and E. Henry Wemme. The first four were elected for 2 years and the others will serve 1 year. The membership has been increased from 380 to 542.

Will Celebrate Road Opening—At a meeting of the Lincoln Highway Association held in Colorado Springs recently it was decided that that city should be the scene of an impressive ceremony early in June when the Lincoln highway through Colorado will be officially declared open for traffic. The directors of the association at the same meeting also approved the routes of the highway through the several counties of Colorado between Colorado Springs and the state line and adopted by-laws and constitution for the organization. The association is booming the transcontinental highway from Kansas City through to the east line of Colorado and at the suggestion of the Lincoln association has adopted the name of Lincoln for the route. The Kansas people are willing to designate their road as the Golden Belt of the Lincoln Highway, and the Golden Belt Association of that state will affiliate with the Colorado body in



GERMAN IDEA OF LUGGAGE-CARRYING SPACE IN THE TONNEAU

making the opening of the Kansas and Colorado branches of the route an important occasion.

Bosch Offers Race Prizes—The Bosch Magneto Co. offers $500 to the winner, $300 to second and $200 to third in the Indianapolis 500-mile race, providing Bosch magnetos are used. For the Santa Monica road races $800 in cash prizes is offered.

Interesting Road Builders—The first of a series of good roads meetings under the auspices of the Decatur Automobile Club, of Decatur, Ill., was held. A. N. Johnson, state highway commissioner, delivered the principal address. The Macon county highway commissioners were guests of honor.

Syracuse Against Cutouts—Secretary Forman Wilkinson, of the Automobile Club of Syracuse, announces that the club will start a campaign against the use of muffler cutouts in Syracuse. A city ordinance prohibits the custom, but it has not been enforced. The club, with the aid of the police department, now intend to enforce it. More bicycle patrolmen will be secured for the work.

Georgia Entry List Big—More than fifty cars have been entered already for the run from Commerce, Ga., to Atlanta and the date for the tour has been set at April 24. The tour will be non-competitive and no prizes will be offered. Pathfinders, confetti cars and pacemakers will be provided by the promoters of the tour. Cars have been entered by motorists of Commerce, Lavonia, Winder and Comer—all towns of northeast Georgia.

Will Help Open Causeway—The Houston Automobile Association, of Houston, Tex., is making preparations to participate in the festivities attending the formal opening of the new causeway across Galveston bay which connects Galveston island and city with the mainland. The event will take place May 15. The opening of the causeway means a great deal to the motorists of Galveston, Houston and a big scope of gulf coast territory. The mainland end of the new structure connects with an extensive system of good roads, including a long stretch of sand-beach course.

Marking Dangerous Road—The Automobile Club of Syracuse, N. Y., is posting forty signs along the dangerous road between Syracuse and Oneida Castle, a favorite road for tourists from all over the country, and a hazardous one, having many sharp right angle turns.

Club Doing Good Work—The Fargo Automobile Club, of Fargo, N. D., has just conducted the first of a series of tours to plat roads in that section. The route was Fargo to Grand Forks on the Minnesota side of the Red river, and back by Hillsboro, N. D., over the proposed Meridian road, south to Mapleton, thence to Valley City and back. All roads in North Dakota and western Minnesota will thus be covered. Signboards are being placed. Former Governor E. Y. Searles is back of the movement.

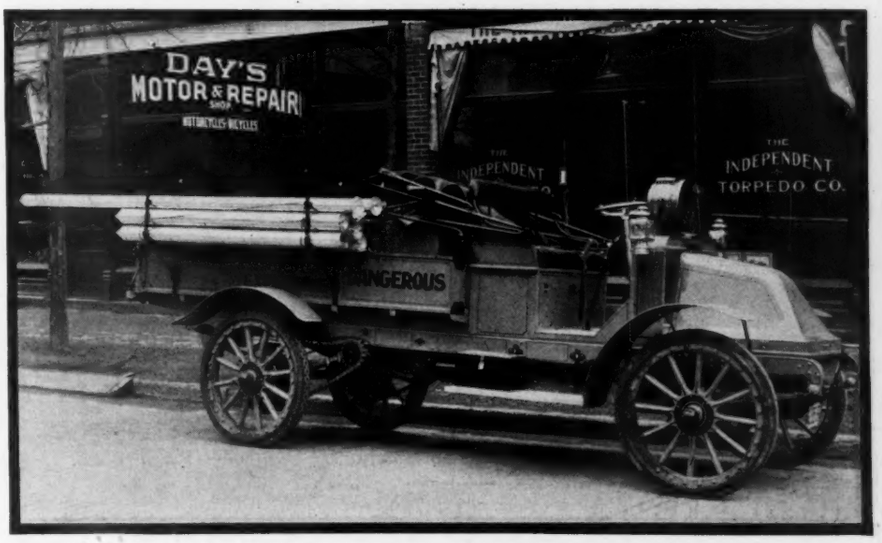
Team Match Date Set—The Chicago Automobile Club and Chicago Athletic Association have decided to hold their fifth annual reliability team match June 27-28. The contest will be to Milwaukee and return.

Wisconsin Club Growing—Nearly 100 members have already signed the charter roll of the newly organized Twin City Automobile Club of Neenah and Menasha, Wis. Officers will be elected at a meeting during the latter part of this week.

Another Club Election—The following officers for the year have been elected by the members of the New Albany Automobile Club, New Albany, Ind.: President George H. Hester; vice-president, Roy E. Miller; secretary and treasurer, Dr. R. S. Rutherford.

Will Entertain Wolverines—More than 150 tourists, members of the Wolverine Automobile Club, of Detroit, Mich., will be the guests of the Remy Electric Co., Anderson, Ind., at a noonday luncheon May 29. They will make their noon control on that date, the second day of their tour from Detroit to Indianapolis, where they will witness the staging of the world's greatest track race, the second annual 500-mile race at the Indianapolis motor speedway, May 30.

Truck Hauls Dynamite—What is believed to be the only truck in a service of this kind, is a truck recently delivered to the Independent Torpedo Co., by the Adams Brothers Co. of Findlay, Ohio. While commonly known as a stock wagon, the truck in question is used for the transportation of nitro-glycerine from one state to another, formerly being hauled overland by horse drawn wagons. The regular body is lined with a pan, in which rests a special body, fitted with compartments for holding the cans.



ADAMS TRUCK USED FOR CARRYING DYNAMITE

The Realm of the

New England Increases Truck Fleet

Ten Million Dollars' Worth of Commercial Motor Vehicles Representing 1000 Machines Put into Service Since September 1, 1911, in Atlantic Coast States

Editor's Note—Digest of address by William P. Kennedy before the Electric Luncheon Club of Boston, Mass., March 15, 1912

UP TO September 1, 1911, there had been put into service in New England $10,000,000 worth of commercial cars, $30,000,000 worth of pleasure cars and 30 per cent of this total was put into service in the preceding 12 months. The equipment in these last 12 months included 1,000 commercial vehicles and 5,000 pleasure cars, giving a gross value of $12,500,000.

For the 6 months between December 1, 1911, and March 1, 1912, indications are that last year's business in New England will be exceeded 50 per cent. In other words, by September 1, 1912, there will be in operation $60,000,000 worth of vehicles. Incidentally, the total annual current consumption for this equipment will be over 65 million kilowatt hours and if this latter may be valued at 4 cents it would represent $2,600,000 annual revenue to public current supply companies if it were possible to serve this entire equipment from central stations.

For the past 2 years nearly 70 per cent of the commercial vehicles put into service was purchased by firms already using electric trucks, so that the gain in new business secured by manufacturers represents only about 30 per cent of their total output.

These figures prove two things: First, that the electric vehicle is economical enough to warrant continual increase in its use by those using it, but second, that there is not created in the minds of those concerns not using it that desire to use it which sound business economy should create.

There have been some recent examples of healthy increase of electric vehicle installations. One consists of 200 machines to the brewery industry; another 200 machines in the express business, and it is expected that there will, within the next 6 months, be an addition of 200 more in the brewery and 500 in the express business.

These brewery and express business trucks show that where transportation is an important problem the companies have readily recognized the superiority of electric vehicles over horse service.

It is an interesting fact that while there are between 4,000 and 5,000 machines used elsewhere, Massachusetts is at the present time employing only 170, of which eighty-seven are in Boston proper, and 111 in Boston and its immediate vicinity. The total for New England would probably not exceed 200 electrics, while there appear to be in the same district 1,800 gasoline commercial cars. The apathy of the New England district is the more conspicuous in view of the fact that no corresponding territory has had expended upon it anything like the same amount of intelligent and persistent effort to educate the prospective users in the benefits to accrue from the use of these machines.

If this situation is to be improved the makers must broaden our efforts and invite the co-operation of not only those immediately interested in the sale and use of machines, but every other influence at work in promoting the employment of electric vehicles. Those engaged in advancing street car service, elevator installations, industrial motor equipment or telephone and telegraph communication should have a common purpose to take this new and sturdy industry by the hand and encourage public intimacy with it to such a degree that the electric vehicle may become as much a prevalent utility as any of the public's present electrical necessities.

One impediment to the introduction of the electric vehicle is the inclination to surround the electric vehicle with unwarranted mystery and to lay stress on non-essential items. One of the greatest difficulties or impediments, is the almost complete absence of knowledge on the part of the users of horse service as to the cost of their transportation, except in the few cases where the service is hired or transportation is the principal part of their business, but until the advocates of motor vehicle employment attempted to make the substitution of machines for horses on an economic basis it is a fact that reliable horse transportation costs were unknown to the average merchant.

It has been astonishing to discover the resentment which exists on the part of the merchant to consideration of details of his wagon service department. He has

COMPARATIVE COST OF UPKEEP OF HORSES AND TRUCKS

HEAVY SERVICE

No. of Horses.	No. of Machines.	Horse. Investment	Machine. Investment	Expense Horse	Expense Machine	Annual Saving	Earnings in % of the Investment	Saving over horse expense in %
75	44	$94,551	$166,733	$136,746	$113,087	$23,660	14.2	17.5
30	11	26,615	36,584	44,198	28,378	15,819	43.2	35.7
16	5	7,975	17,784	15,587	11,557	4,030	22.6	25.8
121	60	$129,141	$221,101	$196,531	$153,022	$43,509	19.6	22.
Relative Proportions		(1 : .5)	1 : 1.70)		(7 : .77)			

MEDIUM SERVICE

35	31	36,485	83,003	91,530	70,663	20,867	25.	23.
17	10	14,300	23,500	29,074	18,972	10,102	42.9	34.
33	20	21,848	51,126	50,249	38,444	11,805	23.	23.3
21	14	39,778	46,170	41,593	31,802	9,791	21.2	23.5
48	37	54,095	75,598	115,284	75,745	39,539	52.3	34.2
154	112	$116,506	$279,397	$327,730	$235,626	$92,104	32.9	28.
Relative Proportions		(1 : .72)	(1 : 1.67)		(1 : .72)			

Commercial Car

Healthy Interest Shown in Electrics

Two Hundred Machines of the Type Now in Operation in New England—Makers Strive to Dispel Wrong Ideas Harbored by Business Men

been accustomed in the past to delegate this to some minor subordinate and entirely forget it himself, so that when car makers bring up the subject and he has to face the music of hearing his actual cost and the saving which might be made by the employment of electric vehicles, usually he is found in an irritated attitude.

There also are existing obstacles at loading and unloading points, which are the great causes of waste in any system, present or future, which must be eradicated before long as economic necessity, even independent of the use of motor vehicles.

Last but not least, the industry is confronted with a prevalent suspicion on the part of purchasing executives that the presentation made to them regarding the economy of electric vehicles is too good to be true. The trade has had several splendid advantages to present economic facts in relation to the cost of operating electric machines on account of the fairly accurate records which have been kept, particularly in large installations over long periods covering upkeep of the wearing mechanical parts, batteries and tires, and these three essentials after all are the only items that are subject to the slightest doubt in presenting the cost of operation.

For the purpose of putting some fact forward to substantiate the generally accepted knowledge among us that remarkable economy may be effected by the substitution of machines for horses, the accompanying table is presented, showing the results of some very complete and exhaustive investigations made with a long period of time devoted to each case and adequate facilities afforded to arrive at an exact knowledge of existing horse cost and to demonstrate beyond question to the prospective purchaser the performance and the cost of operation of the proposed machine equipment. These cases are selected at random from a large collection and represent the transportation departments of prominent annd well known commercial institutions in several of the principal cities.

Two classes of service are covered in this tabulation. One represents haulage of heavy loads requiring vehicles of 2 and 5-ton capacity; and the other group represents medium service where the vehicles are largely composed of ton and ½-ton machines as well as some larger sizes in minor quantity.

The principal feature of this table is the value of saving to be made and its proportionate relation to the existing cost and tc the investment necessary to bring about the reduction. It also is interesting to note the proportionate relations between present horse investment and machine investment, as well as the ratio of machine expense to horse expense.

The figures relating to horse equipment are certified to as correct by the respective owners of the installations and the machine equipment has been determined in every case after complete consideration of the characteristics of the work and extended demonstrations with the actual use of machines to prove that the expected accomplishment was practicable.

LOUD WHISTLE NEEDED

Buffalo's new motor fire engine travels so rapidly that the problem of securing a powerful whistle that can be coupled to the exhaust and will shoot its warning out ahead of the machine is confronting local fire department officials. Recently while whizzing through Main street the engine ran at the rate of 60 miles an hour, but bicycle riders or pedestrians could not hear the warning until the machine was within 50 feet of them, although the huge bell was worked to its full capacity, the driver had the muffler wide open, and the hand siren was being ground at fast rate. This combination of noise normally would be audible fully ½ mile away, but this engine itself travels at such a fast speed that the noise is lost in the air, it is declared.

EDUCATING ATLANTA

That the taxicab is soon to take the place of the horse-drawn cab in Atlanta, Ga., is evident. The Atlanta Cab and Baggage Co., which until now has depended entirely on horse-drawn vehicles, has just installed ten cars and has ordered more. This is in addition to the service furnished by the Atlanta Taxicab Co. Also the Georgian Terrace hotel, the new million-dollar resort and family hotel, has just ordered five taxicabs, five touring cars and three limousines and has broken ground for a garage.

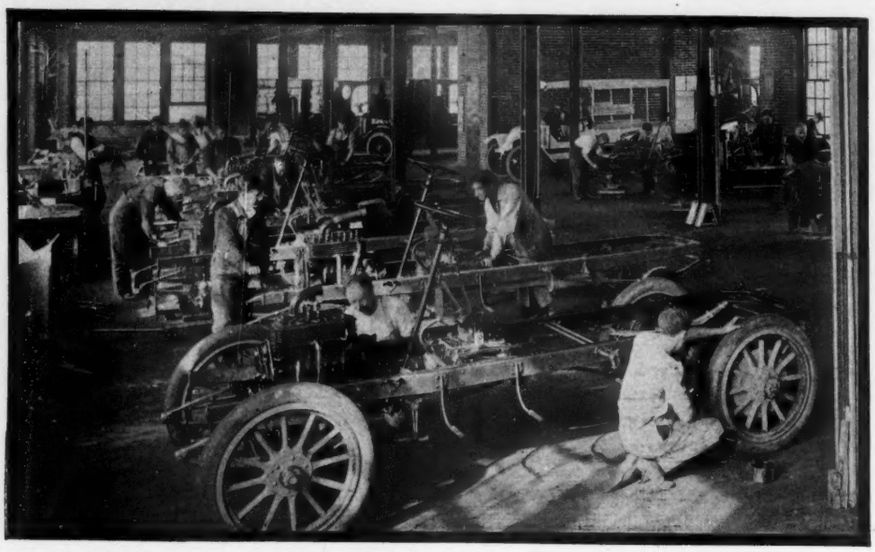
MAKING TEST CASE

After many months of wrangling a test case is to be decided in the courts at New Orleans, La., whether hotels may discriminate against any public vehicle which may desire to solicit patronage in front of their property. A certain line of taxicabs claims to have been granted the exclusive right of the stand in front of one of the prominent hotels. The owner of an outside car who refused to discontinue soliciting business in front of the hotel has been arrested on complaint of the house detective. Each side is determined and the case is likely to go through several courts.

NEW AGENCIES RECENTLY APPOINTED BY COMMERCIAL CAR MANUFACTURERS

Albany, N. Y.	Central Automobile Co.	Adams
Allentown, Pa.	William & C. W. Angle	Alco
Baltimore, Md.	Everitt Auto Co.	Board
Boston, Mass.	Whitney-Barney Co.	Lippard-Stewart
Buffalo, N. Y.	L. G. Schoepflin Co.	Adams
Butler, Pa.	Butler County Auto Co.	Adams
Durham, N. C.	F. B. Lyon Motor Car Co.	Alco
Philadelphia, Pa.	Automobile Repair and Sales Co.	Sandusky
Philadelphia, Pa.	Charles F. Knuth	Service
Pittsburgh, Pa.	Taylor Motor Car Co.	Lippard-Stewart
Porto Rico	Melchoir, Armstrong & Dessau	Alco
San Antonio, Tex.	Commercial Auto and Repair Co.	Adams
South Bend, Ind.	Milton G. Smith Auto Co.	Adams
St. Louis, Mo.	Missouri Car Co.	Alco
Waco, Tex.	Waco Auto Co.	Adams
Washington, D. C.	Motor Truck Corporation	Alco

Among the Makers and Dealers



ASSEMBLY ROOM OF LIPPARD-STEWART TRUCK FACTORY AT BUFFALO.

CINCINNATI. After Factories—The Business Men's Club of Cincinnati has appointed a committee to go after motor car manufacturers who are seeking locations for plants.

New Plant Contemplated—The Manitowoc Brass Foundry Co., of Manitowoc, Wis., contemplates the erection of a new factory more advantageously located than the present works. A decision will be made May 1.

Racine Dealers Organize—Garagekeepers and dealers at Racine, Wis., are planning the organization of an association for promoting their mutual interests and for self-protection. A fight will be waged against the so-called curb dealer who purchases a car to get the agency and then interferes with the activity of legitimate agents. Good roads also will be an aim.

Demonstrates Tube's Strength—To demonstrate the strength of a Republic Black-Line red inner tube, E. K. Allen, representative at Portland, Ore., recently used it as a tow rope, hitching it to a car carrying five persons and hauling the car several blocks, it is said. During the trip the tube never was stretched to its full capacity. When the car started the tube gave nearly its full length, but when the strain of starting from a dead stop was eased, half of the extra length was taken up. On reaching the crossing at Seventh and Stark streets, both cars slowed up to allow a team to cross and before they were under headway again the rear car rolled into the car tracks. Pulling the E-M-F from this depression was the most severe test of the trip and the tube gave over 20 feet. When the car did start, however, it went forward with a bound and the application of the brakes was necessary to prevent it from telescoping the car that was doing the towing.

May Move to Hyattsville—It is expected the assets of the Carter Motor Car Corporation, of Washington, D. C., which is now going through bankruptcy, will be sold at public auction about April 20. A plan is on foot among the stockholders of the defunct corporation to raise sufficient money to buy in the plant and machinery at Hyattsville, Md.

Million for New Plant—It is reported that the J. I. Case Threshing Machine Co., of Racine, Wis., intends to invest $1,000,000 in the new foundry plant now being constructed near the Case car works at Lakeside, Racine. The foundry will be one of the largest in the world and will supply all departments of the vast Case interests.

Alco Branch in New York—A. D. Frost has been appointed manager of the New York branch of the Alco which has just been established. Before the offices at 1886 Broadway were made a branch Mr. Frost was manager of city sales. In his new capacity he will also be in charge of the service building on Jackson avenue, Long Island City. F. A. Crooks has been named as assistant manager of the branch.

Portland Organizes—The motor dealers of Portland, Me., have organized an association called the Portland Automobile Dealers' Association. This was the outcome of a recent meeting to test the sentiment as to what should be done to develop interest in motoring. The first result was a vote of 18 to 5 to have a reliability run, and when the dealers sought some organization to conduct it there was none. So it was decided to organize not alone for that purpose but also to run a show, and if need be build a building for show purposes.

W. G. Johnson Garford Engineer—W. G. Johnson has been appointed as chief engineer of the Garford Co., Elyria, Ohio, succeeding C. A. Neracher, who recently resigned.

Big Packard Shipment—On the last day of March the Packard Motor Car Co. shipped twenty-seven passenger cars and twenty-three trucks. The value of the day's shipments was about $200,000.

Croy Joins Woods Staff—H. L. Croy, assistant engineer and designer of the Inter-State Automobile Co., Muncie, Ind., has resigned to accept the position as assistant chief engineer of the Woods Motor Vehicle Co., of Chicago.

New Indianapolis Concern—The Scheidel-Thompson Mfg. Co. will begin business about June 1 in the Industrial building, Indianapolis, and will manufacture guards, hoods, tanks, pans, tool boxes and other sheet metal parts. Those interested in the company, which is capitalized at $50,000, are George Scheillig, R. F. Scheidel, Bert E. Thompson and George H. Scott.

Hold Show in Barn—When the dealers of Lafayette, Ind., planned to give a motor car show, they found the only available building large enough for the purpose was a horse barn. Arrangements were accordingly made for the sales barn of the Lafayette Stock Farm Co., and the show was held April 4, 5 and 6. A hill-climb was given as a special attraction. About forty cars were shown by Lafayette dealers and distributing agents located in Indianapolis.

Mitchell Using Tents—The Mitchell-Lewis Motor Co., of Racine, Wis., has been obliged to erect several large circus tents on its factory tract in order to supply room for the assembling department of the Mitchell car works. The largest of the tents is 150 by 180 feet in size and was brought from Kansas City by special express. The Mitchell plant is crowded to its utmost capacity and the rush of spring delivery calls caught the company unawares.

New Boston Tire Company—The Walpole Rubber Co., of Walpole, Mass., has embarked in the tire business and salesrooms have been opened on Boylston street, Boston, from where the output will be marketed. E. P. Weber, formerly manager of the Diamond tire branch in Boston, is manager of the tire department for the company. Superintendent Gleason of the Walpole factory some time ago secured patents on a valveless inner tube that the com-

pany may put on the market later. At present the output will comprise regular standard size tires.

Places Big Tank Order—The Carbo-Light Co., of Anderson, Ind., has completed an arrangement with the Shenango Mfg. Co., of Pittsburgh, for the production of something over 50,000 Carbo-Light tanks for distribution throughout the country.

Goodyear's Daily Output—The motor car tire output of the Goodyear Tire and Rubber Co., Akron, Ohio, at the present time is in the neighborhood of 4,000 tires per day, and machinery has been installed to bring this number to 5,000 per day. This number is exclusive of the output of the Canadian plant at Bowmanville.

Start on New Plant—Work was started this week on an addition to the factory of the Lauth-Juergens Motor Car Co.'s factory at Fremont, O., which will when completed enable the concern to double the output of the plant. The company is at present sending out four trucks a week and has more orders than it can fill, it is asserted.

Will Stay in Fond du Lac—The Duplex Coil Co., of Fond du Lac, Wis., has reconsidered its decision to remove its entire plant and interest to Bay City, Mich., and is now practically certain of remaining in Fond du Lac. Sufficient inducements were made by the Business Men's Association to bring about the change of decision. The company manufactures electric lighting systems, coils, etc., and will make several extensions to its plant this year.

Tate Re-elected President—The election of officers for the Automobile Manufacturers' and Dealers' Association of St. Louis was held last week. Frank R. Tate, manager of the United Motor St. Louis Co., was re-elected president. Samuel Breadon, of the Western Automobile Co., is again treasurer. The new vice-president is W. C. Anderson, manager of the Ford branch. The directors include, besides these officers, H. B. Krenning, E. P. Rhodes, C. G. Cabanne, O. L. Halsey, J. H. Phillips and T. L. Hausman.

NEW CLEVELAND SERVICE BUILDING OF LOZIER COMPANY.

Willard Needs More Room—The Willard Storage Battery Co., of Cleveland, O., has moved its executive offices to 5716 Euclid avenue. In addition it is breaking ground for a factory extension which adds approximately 25,000 feet to its present manufacturing facilities.

Seeking Rhode Island Plant—George Wood, who hails from Detroit, has been visiting Pawtucket, R. I., recently, looking over the available sites for erecting a motor car plant as an eastern branch of one of the big companies of the western city. Just what concern it is he will not state.

Favor Traveling Show—It is probable that some definite action toward conducting a traveling motor car show will be taken at the next meeting of the Indiana Automobile Manufacturers' Association, to be held in Indianapolis. The plan is meeting with considerable favor, but if a show of the kind is undertaken, it will not be started until the 1913 models are out. It is proposed to engage a special train and carry a large number of motor cars to various cities, where they would be exhibited for one or two days.

Has a New Scheme—The Continental Highways Advertising Co., of Indianapolis, is planning an advertising campaign between that city and San Francisco, with a Mais motor truck. The route of the Premier ocean-to-ocean tourists is to be followed between the two cities. There will be five men in the party, which will be in the charge of Hugh Annis. The truck is to be equipped with portable wireless outfit, telegraph and telephone connection, typewriter and cooking utensils.

Franklin's Selling Record—The Franklin Automobile Co. has issued a statement to the effect that sales of new series Franklin models in a large number of cities, including Boston, Chicago, New York, Washington, D. C., Dallas, Tex., Philadelphia, and St. Paul, Minn., already show an increase over last year's business at this time of from 50 per cent to 300 per cent.

Tire Company Expanding—The Kelly-Racine Rubber Co., of Racine, Wis., has added $150,000 to its capital to provide for expansion made necessary by the volume of orders now on hand. The annual sales output has grown to $1,200,000 in the 2 years that the company has been operating. George B. Wilson was recently elected president and general manager. C. F. U. Kelly is vice-president; Stewart Webster, secretary and treasurer, and W. T. Lewis and Martin J. Gillen are additional directors.

May Resume Work—The plant of the Findlay Motor Co., at Findlay, O., which was thrown into the hands of a receiver last September, since which time it has been closed, probably will be in operation again in the near future. The plant will be sold at public auction within the next month under an order of the federal court at Toledo. It is said that plans are being formulated by Toledo capitalists to take over the plant and put it in operation upon a more substantial basis than ever before.

BENNETT AUTO CO.'S MOON AGENCY AT SIOUX CITY, IA.

Current Motor Car Patents

ROTHE CARBURETER—No. 1,022,703, dated April 9; to William F. Rothe, East St. Louis, Mo.—The Rothe carbureter is shown in Fig. 2; and it comprises a casing having two substantially horizontal partitions P and PI. The upper partition P has a central opening and a depending annular portion surrounding the central opening. This forms a venturi tube, and constitutes a carbureting fixture. The space above the upper partition P forms a mixing chamber; whilst the space below it is an air chamber. The space below the lower partition PI, forms the float chamber or fuel receptacle. A rod R, which is hollow throughout the lower half of its length, is

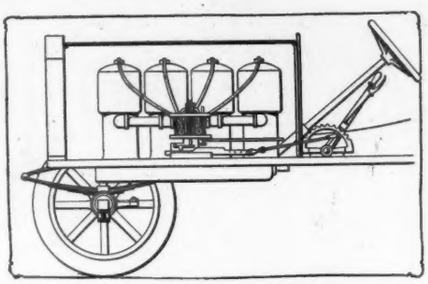


FIG. 1—DUNHAM STARTING DEVICE

fitted through the bore in the central projection of the lower partition PI. This rod is flexibly and adjustably supported above, while the lower end extends down into the fuel of the float chamber. It has a series of perforations in its tubular portion arranged about the top of the central projection of the lower partition PI. There is an auxiliary air-inlet valve L, which controls an opening in the mixing chamber M; and a lever is connected to this valve which is pivoted at V. This lever has an intermediate communication with the vertical sliding sleeve that supports the rod R. In operation, when the vacuum in the mixing chamber is great enough to lift the auxiliary air valve, the rod R also is raised, more of its perforations are uncovered, and more fuel admitted into the mixture.

PATENTS ISSUED APRIL 2, 1912, CONTINUED.

1,022,207—Compensating Steering Gear. Edward T. Reuchert, Jr., New York, N. Y. Filed October 27, 1911. Serial No. 657,061.

1,022,228—Vehicle Spring. Richard James Edwards, Galena, Ill. Filed September 9, 1911. Serial No. 648,565.

1,022,263—Fluid Hydrocarbon Burner. Peter Root, Eureka, Cal. Filed June 9, 1911. Serial No. 632,254.

1,022,273—Means for Heating Motor Car Steering Wheels. Grant E. Smith, Poughkeepsie, N. Y. Filed March 17, 1911. Serial No. 615,100.

1,022,281—Starting Device for Internal Combustion Engines. Frank H. Walker, Atwood, Kans. Filed January 7, 1911. Serial No. 601,261.

1,022,289—Tire Vulcanizing Repair Apparatus. Cecil F. Adamson, East Palestine, Ohio. Filed February 19, 1912. Serial No. 678,518.

1,022,307—Roller Bearing Hub.— William C. Eberhart and Simon Glasser, Sayer, Pa. Filed June 15, 1911. Serial No. 633,374.

1,022,326—Carbureter. Joseph Namur, Kinsley, Kans. Filed August 28, 1911. Serial No. 646,517.

1,022,333—Armored Tire. Victor A. Rouilliard, Fall River, Mass., assignor of one half to Armel L. Audet, Fall River, Mass. Filed December 16, 1911. Serial No. 666,178.

1,022,356—Acetylene Gas Generator. James M. Crowner, Batavia, Iowa, assignor to Atlas Acetylene Lighting Co., Ottumwa, Iowa, a corporation of Iowa. Filed March 22, 1910. Serial No. 551,368.

1,022,360—Flag Holder Attachment for Motor Car Radiators, etc. Oscar S. Fitzsimmons, Waterbury, Conn., assignor to The Novelty Mfg. Co., Waterbury, Conn., a corporation of Connecticut. Filed July 6, 1910. Serial No. 570,541.

1,022,369—Vehicle Wheel. Gerard B. Lambert, New York, N. Y. Filed April 3, 1911. Serial No. 618,533.

1,022,372—Fender. Adolph H. Luebke, Montello, Wis. Filed February 8, 1911. Serial No. 607,225.

1,022,390 — Internal Combustion Engine. Jarvis S. Jennings, Jr., Detroit, Mich., assignor of one-third to Benjamin Siegel, Patrick O'Brien and Leo Breisacher and one-third to Fritz Goebel, Detroit, Mich. Filed September 21, 1909. Serial No. 518,814.

1,022,392—Float Valve for Carbureters. Mathias Weiwoda, New York, N. Y., assignor to George W. Stevens, New York, N. Y. Original application filed February 20, 1909. Serial No. 479,045. Divided and this application filed February 15, 1910. Serial No. 543,959.

1,021,765—Motor Car Primer. Wilber R. Dunkel, Pana, Ill., assignor of one-half to Carter R. Scroggin, Harristown, Ill. Filed December 13, 1910. Serial No. 597,110.

PATENTS ISSUED APRIL 9, 1912

1,022,401—Control Lever for Motor Cars. Louis Chevrolet and Etienne Planche, Detroit, Mich., assignors to Chevrolet Motor Co., Detroit, Mich., a corporation of Machigan. Filed November 15, 1911. Serial No. 660,357.

1,022,413—Lower Crankcase for Combustion Engines. William H. Goldstine, Flint, Mich. Filed July 28, 1910. Serial No. 574,382.

1,022,425—Centrifugal Pump. Gusta C. Kuech. No. 588,013.

1,022,430—Spring Wheel for Vehicles. Frederick William Margetts and William Henry Margetts, East Dulwich, England. Filed November 12, 1910. Serial No. 502,050.

1,022,431—Motor Car Locking Mechanism. Carle L. Maskey, Cleveland, Ohio. Filed January 17, 1910. Serial No. 538,441.

1,022,463—Motor Car Lamp Bracket. John E. Browne, Brookline, and Henry Herbert Colson, Everett, Mass. Filed May 1, 1911. Serial No. 624,275.

1,022,476—Explosive Engine. Frank J. Gremel, Detroit, Mich. Filed March 14, 1910. Serial No. 549,321.

1,022,492 — Internal Combustion Engine. John J. McIntyre, Hartford, Conn. Filed April 12, 1910. Serial No. 555,046.

1,022,502—Gas Engine. James H. Pierce, Bay City, Mich. Filed March 5, 1909. Serial No. 481,295.

1,022,538—Starting Device for Gas Engines. Carl E. Dunham, Maddock, N. D. Filed April 18, 1911. Serial No. 621,850.

1,022,542—Nut Lock. William Fry. Edinburgh, Va. Filed December 19, 1911. Serial No. 666,828.

1,022,567—Resilient Hub for Vehicle Wheels. Earl J. Seifried and Isaac G. Seifried, Findlay, Ohio. Filed February 13, 1911. Serial No. 608,432.

1,022,589—Motor Car Headlight. Edgar J. Lutwyche, Chicago, Ill. Filed April 10, 1911. Serial No. 620,011.

1,022,622—Lubricator. Howard E. Coffin, Detroit, Mich., assignor to Chalmers-Detroit Motor Co., Detroit, Mich., a corporation of Michigan. Filed June 26, 1909. Serial No. 504,538.

1,022,639—Brake. Frank O'Brien, Jackson, Mich., assignor to The Lewis Spring & Axle Co., Jackson, Mich., a corporation of Michigan. Filed September 18, 1911. Serial No. 649,860.

1,022,648—Spring Wheel. Elmer E. Wickham, Windsor, Mo. Filed December 10, 1910. Serial No. 596,702.

1,022,651—Buffer for Motor Car Doors. Lewis A. Medard, Boston, Mass. Filed July 12, 1911. Serial No. 638,092.

1,022,662—Radiator. George W. Dunham, Detroit, Mich., assignor to The Chalmers Motor Co., Detroit, Mich., a corporation of Michigan. Filed May 28, 1910. Serial No. 563,891.

1,022,664—Carbureting Apparatus. Lewis M. Ellis, Detroit, Mich., assignor to Ellis Engine Co., Detroit, Mich., a corporation of Michigan. Filed January 7, 1911. Serial No. 601,424.

1,022,657—Nut Lock. John Buttner, Fayette City, Pa. Filed January 2, 1912. Serial No. 668,811.

1,022,658—Tire Guard. Charles Dabelstein. Detroit, Mich. Filed October 14, 1911. Serial No. 654,588.

1,022,686—Gas Engine. John Loftus, Albany, N. Y. Filed December 17, 1910. Serial No. 597,750.

1,022,689—Resilient Tire. Hans A. Meinhardt, Pittsfield, Mass. Filed September 15, 1911. Serial No. 649,438.

1,022,702—Carbureter. William F. Rothe, East St. Louis, Ill., and Earle E. Culp, St. Louis, Mo. Filed February 27, 1911. Serial No. 611,180.

1,022,703—Carbureter. William F. Rothe, East St. Louis, Ill., and Earle E. Culp, St. Louis, Mo. Filed February 27, 1911. Serial No. 611,181.

1,022,719 — Windshield Frame. Stewart Brown, Chicago, Ill. Filed November 6, 1911. Serial No. 658,779.

1,022,735—Resilient Tire. Emil E. Hoff, San Rafael, Cal. Filed March 14, 1911. Serial No. 614,294.

1,022,751—Motor Controlling Mechanism for Motor Vehicles. James W. Packard, Lakewood, N. Y., assignor, by mesne assignments, to Packard Motor Car Co., Detroit, Mich., a corporation of Michigan. Filed April 20, 1906. Serial No. 312,823.

1,022,775—Vehicle Spring. Frederick Denman, Highland Park, Ill. Filed September 9, 1910. Serial No. 581,297.

1,022,801—Instrument for Indicating Speed and Running Time of Machines. Ralph Shipman, Sunbury, Pa. Filed April 5, 1910. Serial No. 553,610.

1,022,803 — Internal Combustion Engine. George A. Troutt, Detroit, Mich. Filed February 10, 1910. Serial No. 543,023.

1,022,820—Starter for Internal Combustion Engines. George G. F. Boswell, Indianapolis, Ind., assignor of one-half to John L. Peetz, Indianapolis, Ind. Filed Feb. 6, 1911. Serial No. 606,695.

1,022,828—Dual Ignition System. Richard H. Cunningham, New York, N. Y. Filed February 9, 1910. Serial No. 542,879.

1,022,832—Magneto for Internal Combustion Engines. Alfred Durbin, McConnelsville, Ohio. Filed February 4, 1911. Serial No. 606,511.

1,022,842—Detachable Rim for Resilient Tires. John William Hall and Cyril Baynes, London, England. Filed July 20, 1908. Serial No. 444,493.

1,022,845—Variable Speed Gearing. William H. J. Hipple, Philadelphia, Pa. Filed June 8, 1911. Serial No. 631,882.

1,022,856—Tire. Frank Marinics, Expedit, Pa. Filed October 6, 1911. Serial No. 653,186.

1,022,864—Gas Engine. Robert S. Moore and James Lee Simmons, Washington, D. C., assignors to Gyro Motor Co., Washington, D. C., a corporation of Delaware. Filed November 1, 1910. Serial No. 590,237.

1,022,885—Resilient Wheel. Arthur Sherwood, Plantsville, Conn. Filed January 24, 1911. Serial No. 604,447.

1,022,887—Wheel. Harlow Orville Shockley, Darlington, Wis. Filed November 25, 1911. Serial No. 662,411.

1,022,909—Universal Joint. William A. Whitney, Rockford, Ill. Filed July 30, 1908. Serial No. 446,055.

1,022,946—Sight Feed Lubricator. Foster J. Hull, New York, N. Y., assignor to The Thomas W. Pangborn Co., New York, N. Y., a corporation of New York. Filed July 12, 1910. Serial No. 571,609.

1,022,966—Resilient Tire. Harry B. Montgomery, Harrisburg, Pa. Filed June 29, 1911. Serial No. 636,043.

1,022,991—Oiling System for Motor Cars. Ernest M. White, Globe, Ariz. Filed July 29, 1911. Serial No. 641,299.

1,022,999—Motor Car Shaft Coupling. John N. Bashaw, Lake Geneva, Wis. Filed February 18, 1911. Serial No. 609,492.

1,023,007—Motor Car Door. Lucian R. Colbert, Massaponax, Va. Filed April 8, 1911. Serial No. 619,883.

1,023,017—Ball Bearing. Henry Hess, Philadelphia, Pa., assignor to the Hess-Bright Mfg. Co., Philadelphia, Pa., a corporation of Delaware. Filed May 25, 1908. Serial No. 434,862.

1,023,025—Vehicle Wheel. Byron W. Miller, Colorado Springs, Colo. Filed June 12, 1909. Serial No. 501,742.

1,023,026—Motor Car Light Turner. Ward G. Moxley, Ravena, N. Y. Filed August 26, 1911. Serial No. 646,231.

1,023,045—Motor Car Truck. David Elhanna Shipley, Joplin, Mo. Filed October 14, 1908. Serial No. 457,731.

1,023,088—Explosive Engine. John W. Meaker, Detroit, Mich. Filed June 9, 1910. Serial No. 565,908.

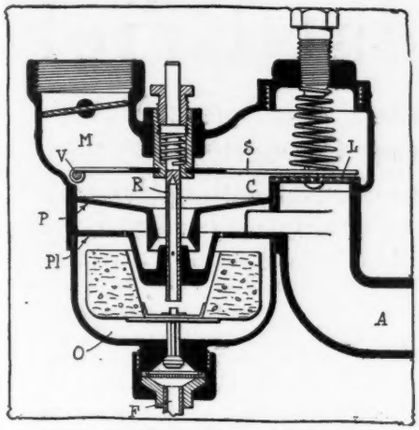


FIG. 2—THE ROTHE CARBURETER

Dunham Starting Device—No. 1,022,538, dated April 9; to Carl E. Dunham, Maddock, N. D.—This patent relates to a device for starting internal combustion motors, which when applied to a motor car is arranged as indicated in Fig. 1. It is a combination of a tank for gas under pressure, a pipe connecting the tank to the cylinders of the engine, valves arranged in the pipe for closing direct communication between the tank and the engine, and manually operated means for alternately opening the valves.

White Oiling System—No. 1,022,991, dated April 9; to Ernest M. White, Globe, Arizona—This patent relates to a circulating type of oiling system; in which the lower portion of the crankcase contains a series of supplemental reservoirs into which the dippers on the ends of the connecting rods scoop. Each supplementary reservoir has an overflow outlet at its forward side, and a pocket to receive and hold oil when the forward end of the crankcase is raised. A pump is employed to transfer the oil from the main reservoir at the lowermost portion of the crankcase, to the supplementary reservoirs.

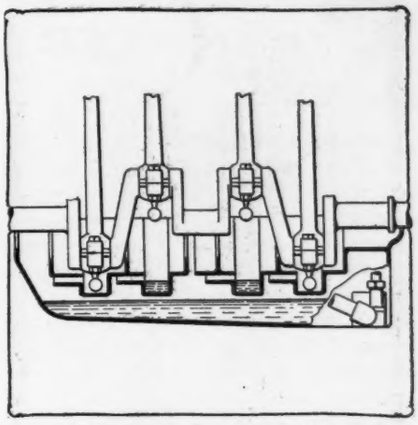


FIG. 3—WHITE OILING SYSTEM

Legal Lights and Side Lights

MASSACHUSETTS' TROUBLES

THE committee on roads and bridges of the Massachusetts legislature is getting plenty of motor legislation this year, and some of the members are sorry they ever were put on the committee. Last week on Tuesday the committee met in executive session and agreed that the time was ripe to spring its bills and so Senator Frank J. Horgan, the representative of Mayor Fitzgerald of Boston on the committee, presented two measures, one for an increase in fees and the other on the trucks. The bills were assigned for special debate Monday. A couple of newspapers got busy and the Globe pointed out that while the governor and the mayor recommended an increase that would tax the higher powered cars more, the bill did just the opposite and that the burden fell upon the little car owners.

This was like dropping a bombshell into the camp of an enemy. The committee had another meeting Thursday and leave was asked to have the bills recommitted to the committee on the plea that there were a few mistakes brought about by misleading figures on the part of the highway commission. As a matter of fact, the committee really did not know where it was at, it is alleged, for it had succeeded in having the state association agree to a fee of $5 for all cars under 10 horsepower and 50 cents per horsepower above that figure. But the committee did not take into consideration that about 70 per cent of the motorists owned small cars and the increase would fall more heavily upon them, while the few hundred owners of high-powered cars would get off with about the same fee they are now paying. The Globe story exploded the plan temporarily and now the committee is wrestling with a problem that will not tread upon the feet of the men they did not want to hurt.

At the same time the committee reported that the truck bill if it ever becomes a law will put the commercial industry out of business in Massachusetts, it is declared. The bill first calls for truck fees based upon horsepower the same as the pleasure cars, which is pointed out as unfair because the big electric vehicles would be paying only a small fee while the gasoline trucks would be paying a big sum. It also provided that the trucks should not be allowed to run on the highways if the load and truck combined weighed more than 6 tons without first getting a special permit from the city officials of cities and towns through which it passed except in Greater Boston. In other words it confines the trucks to Boston and vicinity.

Then it says the city and town authorities can say on what roads the trucks may run so if a man wanted to order a load of coal for example, and he lived on a street where the city or town officials did not want to let the truck pass the coal man would have to employ horses instead of trucks whether he wanted to or not. There also is a speed limit down to 8 and 10 miles and a plan for keeping the load to 800 pounds per inch of tire.

In fact all the bad features brought out at the hearing and which even Colonel W. D. Sohier of the highway commission admitted should be changed, he being the man who drew up the bill, are embodied in it. There is a protest, for it looks as if the committee members were playing to the railroads, it is alleged, as to pass such a bill would mean the monopolizing of all freight by the steam and electric roads. As a matter of fact the bill exempts the railroads from the clauses without specifying that it means on rails thereby showing it is really special legislation, and of a most dangerous kind. From now on there promises to be a big fight.

The Motorists' Bookman

A HANDY GUIDE TO EUROPE

"A SATCHEL Guide to Europe," while not revised for 1912 by Dr. Rolfe, has been brought to date in conformity with the plan of previous yearly editions. The fact that the Satchel Guide is revised annually makes it especially valuable for the vacation tourist for whom it is designed. Because of these yearly revisions, the prices of trips mentioned more closely approximate the actual cost than if revision was made less often. The chapter "Introductory Hints" is particularly valuable to one making their initial trip on the Continent, as many important matters are mentioned, some of which might be overlooked by the uninitiated in European travel. The little volume is enriched by half a dozen excellent folding maps. Published by the Riverside Press, Cambridge, Mass. Price $1.50 net.

Inductance of Coils

"Inductance of Coils," by Morgan Brooks and H. M. Turner, has just been issued as bulletin No. 53 of the engineering experiment station of the University of Illinois. This bulletin discusses the theory and determination of the self-inductance of coreless coils. An empirical modification of the common formula for the inductance of solenoids is presented as the Brooks universal formula applicable to all forms of cylindrical coils. Easy methods are given for predetermining the dimensions of a coil for any required reactance or inductance, for any purpose from the massive power protective coils to the smallest instrument coils. Definite coil proportions are assigned for producing the maximum inductive effect with a given length of conductor and data are furnished on the relation of the mutual inductance of adjacent coils to their self-inductance.

Development Briefs

Long-Expected Westinghouse Air Spring Makes It's Appearance—Details of Construction of the Pneumatic Shock Preventer—Rex Signalling System

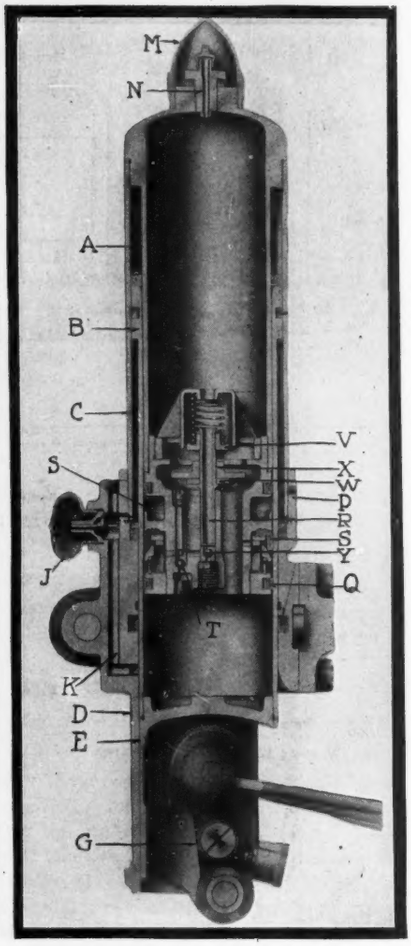


FIG. 1—WESTINGHOUSE AIR SPRING

Westinghouse Air Spring

FOR the last 4 or 5 years there have been rumors of an invention of George Westinghouse by which the necessity for pneumatic tires would be eliminated. The newspaper stories which appeared from time to time in regard to it told of a method of putting the air cushion in the spring suspension instead of in the tires. The idea has at last appeared in material form. The device takes the shape of a shock absorber and is designated by Westinghouse as an air spring. Its general appearance is illustrated in Fig. 5 and its attachment to the car shown in Fig. 2. In appearance the Westinghouse air spring resembles a big cylindrical shock absorber, but stress is laid by the inventor upon the fact that the device is a spring in which the air is compressed to take away the excess strain from the regular suspension and to take up the shocks which otherwise would be transmitted from the axles to the body, the gradual expansion of the air regaining its initial volume to absorb the rebound.

In the construction of the Westinghouse spring advantage is taken of the perfect elasticity of air. If air is compressed and then permitted to expand again it will assume its former volume if the original conditions be reached. In its simplified form the device consists of two cups, the outer ends of which are closed and which are telescoped one into the other and filled with air at atmospheric pressure. On telescoping the cups further into one another the air is compressed and absorbs the work of moving the cups into each other. If the pressure behind the cups be taken off they return to their original position with decreasing speed. The resistance increases as the tubes move further into each other, for the pressure of the air is increased. If, now, the inner space be partially filled with a liquid, the distance through which it is necessary to move the cups in order to compress the air to a given pressure is decreased.

In the actual construction this arrangement is somewhat more elaborate. The interior details of the device are illustrated in Fig. 1. Two tubes, A and B, represented by the upper and lower open spaces, telescope and a third tube, or casing C, is employed to keep dirt out of the telescoping tubes. The cross-head E and the tube B to which it is attached are made to move correctly by a steel casting D. The tube B is enlarged at its upper end to form a piston and held against C by packing Q. An inlet valve J forms a breather to take in the air and is packed with a fibrous filtering material which serves to keep dirt out of the mechanism. When the air is compressed in A by the relative movement between A and B the space between C and D is made larger and air is brought in through the breather J. When the air in A expands again, the air which has entered through J passes through a passage K into a port which surrounds B and blows out between B and D.

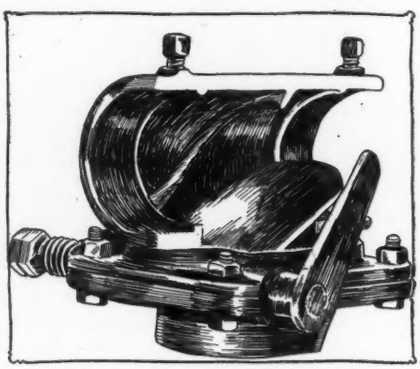


FIG. 3—G-P MUFFLER CUTOUT

At the upper end is another valve N by which the quantity of air in the tube A can be adjusted. This is protected by a screw cap M. At the lower end of A is attached a piston provided with packing rings. In this there works a hollow plunger U of a single-acting pump. Secured to the upper end of the plunger are two collars, V and W, with a sliding disk X between them. U is normally held in its lowest position by a spring which presses on the collar V, so that if the air in A is compressed, the spring is also compressed and an upward stream of oil which fills the portion below the plunger rises until it strikes the sliding disk X. This raises the disk, lifts the collar V, and the plunger of the pump and passes from the lower chamber through the space closed by the valve T and up through the plunger to the upper tube.

In fitting the Westinghouse air springs to the car a short piece is cut off the front end of the frame and a special supporting member riveted on to it. This bracket fits the channel of the frame. To it is bolted the upper tube of the absorber, while the lower portion to the

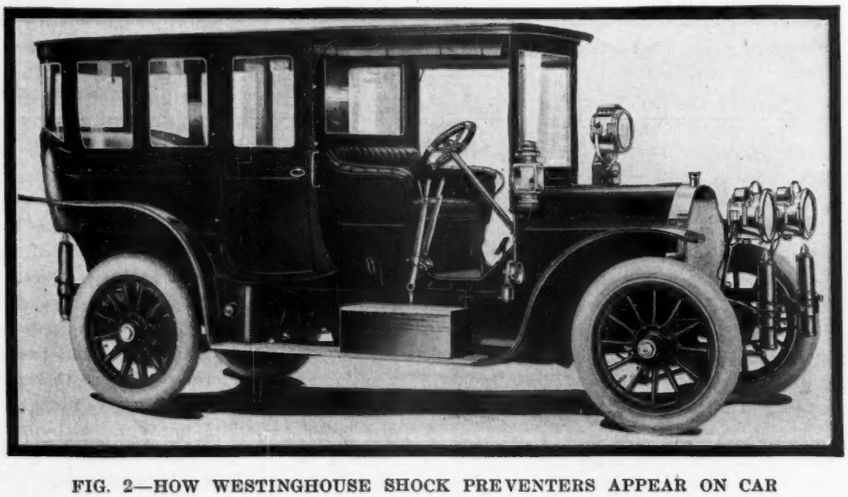


FIG. 2—HOW WESTINGHOUSE SHOCK PREVENTERS APPEAR ON CAR

Novelties for Motoring

Some of the Latest Accessories for Motorists—G-P Muffler Cutout—Conover Safe-Guard a New Form of Bumper—New Device Shows Driver's Intentions

shackle end of the ordinary spring suspension. This is in case the semi-elliptic springs are used at the front. With rear springs such as elliptic or three-quarter the upper spring is removed and a special bracket bolted to the frame. The air spring has a normal travel of 6 inches. It is manufactured by the Rapid Fire Gun and Powder Co., of Derby, Conn. It is said to have been under test for 3 years on a number of cars ranging from 1,000 pounds to 5,600 pounds and, while not entirely replacing pneumatic tires for passenger vehicles, increases their durability and gives much easier riding.

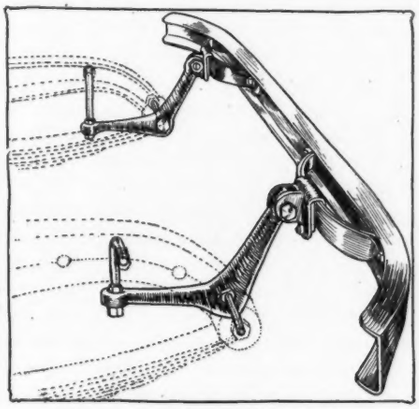


FIG. 4—CONOVER SAFE-GUARD

Rex Signaling Device

There have been many devices offered to motorists which are intended to indicate to following or passing vehicles contemplated movements of the car so that the drivers in front or behind may be guided thereby, and thus eliminate danger of collision. Among the latest of these is the Rex signaling device, manufactured by Fredericks & Meier, New York. It is illustrated in Fig. 5 and in its complete form consists of two signals, one to be placed at the rear and one at the front with a specially constructed switch to be placed on the steering post. The front signal is placed on the dashboard, or the peak of the limousine, to show the traffic officer and public or a car coming in the opposite direction the driver's intentions. The rear signal will flash up at the same time to inform the driver of a trailing car what to expect. The front signal lights arrows pointing to either right or left or shows the word "stop." The rear signal lights similar arrows and shows the words "turning," "slow" or "stop." This also forms the ordinary tail light as well as illuminating the number plate for which attachment is provided. The switch on the steering wheel operates the signals when a lever is thrown to the corresponding point. It is so constructed that only one signal can be flashed up at a time. It is stated that the signals can be seen at a distance of 300 feet.

Conover Safe-Guard

One of the latest types of bumpers is illustrated in Fig. 4. This is the Conover Safe-Guard marketed by the Lovell-McConnell Mfg. Co., Newark, N. J. Its distinctive features are that instead of the small tubing usually employed there is a bronze channel bar whose contact surface is not round but flat and is 2 inches or more in width. The claim for this shape is that a severe shock is distributed over a wide area and its force lessened. To withstand this shock there is interposed between the channel bar and its attaching arm heavy semi-elliptic steel strings similar to the chassis springs on the car. These support the bar at four points. The attaching arms are bell cranks pivoted at their centers to the front ends of the chassis springs and at their other ends to rods bolted to the frame.

G-P Muffler Cutout

In Fig. 3 is illustrated the G-P muffler cutout made by the G. Piel Co., Long Island City, N. Y. The construction of the valve tongue is said to be such that when the cutout is open the line to the muffler is completely shut off and a correct angle is obtained for deflecting the exhaust gases freely. The muffler cutout is made in two parts, enabling quick access to its interior. As it opens against exhaust pressure the latter cannot open it when it is closed. The ends of the cutout are bored to the exact size of the exhaust pipe with shoulders at each end so that in attaching it is only necessary to slip the cutout over one end of the exhaust pipe and the muffler end of the pipe into the other side of the cutout, and then tighten two set screws.

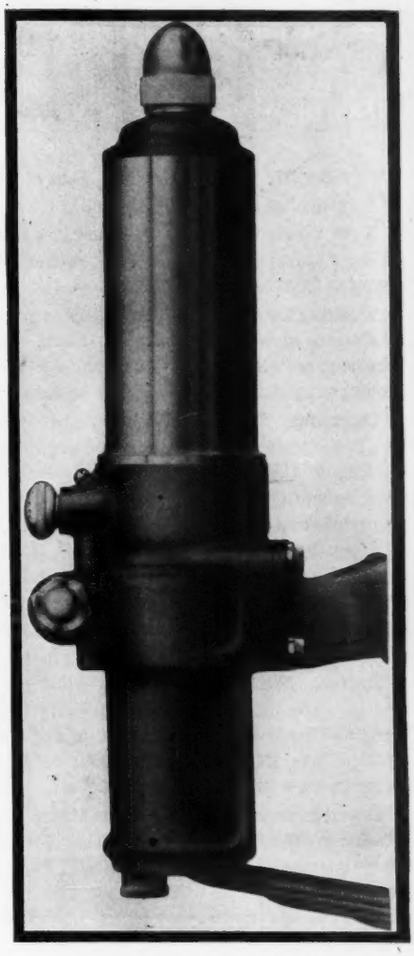


FIG. 6—THE PNEUMATIC SPRING

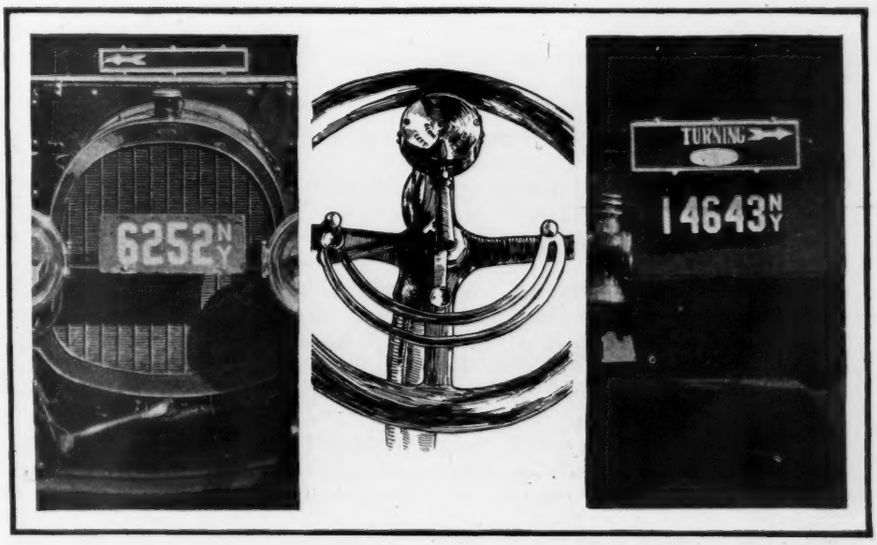


FIG. 5—FRONT AND REAR SIGNALS AND STEERING WHEEL SWITCH OF REX SYSTEM

Brief Business Announcements

WABASH, IND.—C. M. Story has opened a garage in this city.

New Westminster, B. C.—The MacLean & Burr Garage Co. has recently taken the agency for the Stoddard-Dayton.

Washington, D. C.—The King agency has been given to Robert H. Love, who has secured temporary quarters at 1509 Fourteenth street, N. W.

Columbus, O.—The White Auto Sales Co. is the name of a new concern organized to handle the White line in central Ohio. The concern is located at 170-172 North Fourth street.

Lynn, Mass.—J. William O'Donnell, Jr., a 19-year-old youth, is to have charge of the Lynn agency of the Morgan truck. He is believed to be the youngest car dealer in New England.

Detroit, Mich.—Tom Jones, who made the trip around the world as publicity man for the Hupp Motor Co., has joined the staff of the R. C. H. Corporation as publicity man and assistant export manager.

Superior, Wis.—The Superior Motor and Machine Works has leased the former Cary garage at Tower avenue and Seventeenth street and will operate it as a branch of its main garage at Broadway and John avenue.

San Diego, Cal.—The Bowler Motor Car Co., Cole agent, has been reorganized and in the future will be known as the Cole Automobile Co. It is constructing a new salesroom and service station near the Spreckles theater building.

Minneapolis, Minn.—F. A. Babcock has been appointed manager of sales for the R. C. H. Corporation in Minnesota, the Dakotas, Montana and northern Wisconsin. His headquarters will be with the R. C. H. branch in Minneapolis.

New York—R. T. Houk, who for the past year has been sales manager of the Stoddard-Dayton division of the United States Motor Co., has decided to enter another field of work. He has resigned to accept the position of general manager of a large mill in Ohio, in which he has been a director for a number of years.

Worcester, Mass.—The Standard Woven Fabric Co. has appointed the following agencies and sales branches for Multibestos brake lining and friction material: Boston, Mass., 903 Boylston street, A. L. White, manager; New York city, 237 Lafayette street, Flint & Chester; Philadelphia, 1416 Vine street, Petry-Cassidy, Inc.; Buffalo, N. Y., 720 Main street, James G. Barclay; Detroit, Mich., 1598 Woodward avenue, Fred E. Holmes Co.; Chicago, 1430 Michigan boulevard, F. E. Sparks; San Francisco, Fred Ward & Sons. The company also has selling agencies with the Capen Belting and Rubber Co., St. Louis, and Fred K. Blanchard, Troy, N. Y.

Sacramento, Cal.—The new address of the E. C. Smitton Co., Cole agent, is 1308 K street.

Buffalo, N. Y.—W. F. Reynolds has recently become sales manager of the Lippard-Stewart Motor Car Co. of Buffalo.

Boston, Mass.—W. T. Savoy, formerly general branch manager for the Autocar company, has been sent to Boston as manager of the branch there.

St. Louis, Mo.—The Capen Motor Car Co. has taken the agency for the Autocar truck in St. Louis. The Detroiter agency for St. Louis has been taken by the Brown Automobile Co.

Washington, D. C.—A petition for the dissolution of the Automobile Owners' Supply Co. has been filed, the equity court has authorized the receivers to sell the assets of the corporation.

Boston, Mass.—The Boston Motor Wagon Co., which filed articles of registration September 15 last, has withdrawn them. The company was organized by G. Frank Davenport to handle the Detroit motor wagon.

Washington, D. C.—The Cook & Stoddard Co., agent for the Pierce-Arrow, Cadillac and Baker, is erecting a large salesroom and service department on Connecticut avenue and expects to take possession about May 1, at which time its salesrooms at 1313 H street, N. W., will be vacated.

New Britain, Conn.—L. A. Gladding has secured a 20-year lease of the brick garage and factory building owned by L. M. Barnes on Main street, as the latter has decided to retire from the motor business. Mr. Gladding intends to improve the property and make it larger and more valuable.

Baltimore, Md.—The Charter Automobile Co. has been organized for the purpose of handling the Havers car in Baltimore and Maryland, with Clinton R. Foutz, president, and Edward W. Byrd, secretary and treasurer. The company will have its showrooms and garage in the vicinity of Mt. Royal and Maryland avenues.

Detroit, Mich.—The Baker Electric Co. of Michigan was officially incorporated April 3. The officials of this new factory branch of the Baker company are J. Caldwell Walker, of Detroit, president; R. C. Norton, Cleveland, vice-president; William C. Burnett, Detroit, secretary and treasurer. The new Baker salesroom will be on Woodward avenue. The new sales organization of the Baker company in this city succeeds the E. I. Rumsey Garage Co. However, the Rumsey people have a working agreement with the new Baker sales company, whereby they will act as service station for Baker and other electric owners in this city.

St. Louis, Mo.—The Missouri Motor Car Co. is erecting a new salesroom at 3005 Locust street.

Hastings, Neb.—Ernest A. Brandes has taken the Overland for the western part of Nebraska. His garage is 66 by 125 feet.

San Francisco, Cal.—In the reorganization of the selling force of the Standard Motor Car Co. William H. Thompson was appointed sales manager.

Columbus, O.—Papers have been filed with the secretary of state changing the name of the C. N. Lippert Auto Co., of Lorain, Ohio, to the Lippert & Hackenbranch Auto Co.

Columbus, O.—The Columbus Auto Brass Co., of 181 West Maple street, has opened a new department to be known as the plating plant. The department is well equipped and the company specializes in replating lamps, radiators, fenders, windshields and other equipment.

Janesville, Wis.—F. O. Ambrose, machine shop and boiler manufacturing, has purchased additional space and will open a garage and repair shop on April 15. He will have the agency for the Reo. The boiler and machine business will be continued at the present quarters.

Milwaukee, Wis.—The Reliance Auto Repair Co. is the name of a new corporation organized at Milwaukee to conduct a garage and repair shop. Frederick F. Giese, Albert E. Brandenburg and Robert N. Sessions are the promoters. The company is capitalized at $5,000.

Madison, Wis.—The Rambler is to have direct represenation in Madison. The Copeland-Roach Motor Co., of Watertown, Wis., has established at the Wisconsin capital a garage, office and salesroom at 118 South Franklin street. The salesroom will be in charge of T. A. Wondreyka.

Shreveport, La.—The Orme Motor and Transfer Co. has been organized in this city by H. C. Brewster, H. S. Edwards and J. H. Orme. The company has a capital of $25,000 and in addition to taking the agency for the Moon cars for North Louisiana they will engage in the transfer business.

Syracuse, N. Y.—L. R. Gindrat, formerly manager of the Baltimore branch of the Franklin Automobile Co., has been appointed sales manager for the southern district in accordance with the new selling policy adopted by the Franklin Automobile Co., whereby each district has its own sales manager. The territory under the direction of Sales Manager Gindrat includes North Carolina, South Carolina, Georgia, Alabama and Florida. Mr.

Gindrat will make his headquarters at Atlanta.

Lawrence, Mass.—Herbert Ellis, Cole agent, has moved into new quarters at 298 Jackson street.

Los Angeles, Cal.—R. A. Wood is the newly appointed manager of the Los Angeles branch of the Elmore Motor Car Co.

Detroit, Mich.—Cecil Taylor has resigned his position as consulting engineer of the Studebaker Corporation, and is working on independent lines.

Waterbury, Conn.—Almon C. Judd, manager of the Elton, has arranged to take possession of the garage of E. H. Towle on Harrison avenue on May 1. He will retain Towle as his manager.

Portland, Ore.—E. W. Hill has taken the Oregon agency for the White pleasure cars, succeeding the White Motorcar Co., of Portland. Mr. Hill has been connected with the White factory for several years.

South Bend, Ind.—William McGlashan, formerly designing engineer with the Winton Motor Carriage Co., has resigned to accept the position of chief engineer to the Studebaker Corporation at its South Bend factory.

Atlantic City, N. J.—W. B. Thompson, owner of the Chelsea garage and Cole agent in Atlantic City, has moved into a new salesroom at 3331 Atlantic avenue. He will retain his service department at 22 North California avenue.

Portland, Me.—The Taxicab Service Corporation has been organized. George C. Whitmore is president; William D. Sawyer, treasurer, and Elton H. Thompson, secretary. Ground has been broken at 112-114 Spring street for a concrete garage to be used by the company.

Boston, Mass.—The Taxi Motor Cab Co., of Boston, has moved into the Cyclorama building on Tremont street, where it has two floors, each with 16,000 square feet of floor space, making it one of the largest garages in New England. The company occupies the entire building.

Shreveport, La.—The Indian Head Polish Co. has been organized here and will manufacture metal polishes and body and furniture polishes. The company is also putting on the market a soap for use by mechanics and engineers. The offices of the new company are located in the building on the corner of Spring and Lake streets. The plant is located on McNeil street near Fannin street.

Oskaloosa, Ia.—The Economy Auto Co., Cole agent, has changed its name to W. H. Novac Auto Co.

Billings, Mont.—R. L. Baker, Franklin dealer in this territory, has removed to a new salesroom at 21 North Twenty-ninth street.

Puyallup, Wash.—A. A. Rutledge has opened a garage and will handle the Brush cars for Puyallup, Sumner and the other towns of the Puyallup valley.

New London, Conn.—N. V. and H. N. Porter, of Norwich, have taken the agency for Maxwell cars for New London county and they have contracted for a new garage to be opened here shortly.

Spokane, Wash.—Harry Bell has resigned the managership of the Metropolitan company to join the forces of the Consolidated Auto Co., taking with him the agency for the Mitchell cars.

Portland, Ore.—E. E. Sleret, president of the Ford Motor Car Agency, has assumed personal management of the Portland Ford branch, succeeding as active manager Arthur J. Edwards, who resigned.

Springfield, Mass.—R. A. McKee has signed a lease with George Smith & Co., proprietors of the Auto building on Worthington street, for the erection of a two-story building to be used as garage on the lot adjoining the Auto building.

Portland, Ore.—The Portland Motor Co. has moved to Twenty-third and Washington streets. The United Auto Co. has moved into its new home at Sixteenth and Alder streets. The Becker Automobile Co. has moved to its new home at Fourteenth and Everett streets.

San Francisco, Cal.—A. J. Rogers, who has been connected with the sales department of the Remy Electric Co., Anderson, Ind., maker of Remy magnetos, has been transferred to the San Francisco branch, 170 Golden Gate avenue, in the capacity of branch manager.

Newark, O.—E. T. Rugg & Co. have organized a new company to manufacture motor car tires. The new concern is to be known as the Newark Auto Tire Co. E. T. Rugg, of the former concern, is the principal owner of the new company, over which he will have active charge. The former company has made a large success in the manufacture of halters and webbing.

Barron, Wis.—Patrick & Coleman have established a garage and repair shop in the Klein building.

Detroit, Mich.—The Metzger Motor Car Co. announces the appointment of T. A. Peck as manager of its technical department.

Victoria, Tex.—The Victoria Motor Car Co. has been organized here with a capital stock of $5,000. The incorporators are Welder Daniel, J. T. Linebaugh and W. H. Crain.

Racine, Wis.—Wolff Brothers have established a plant in Joliet, Ill., for the manufacture of brass patterns and specialties. The firm consists of Fred, Elvin, Louis, Gustave and Max Wolff.

St. Louis, Mo.—Earl J. Hoffman, formerly with the Timken Roller Bearing Co., and Robert W. Maloney have been added to the force of the Neustadt Automobile and Supply Co. as department managers.

Milwaukee, Wis.—Abram H. Esbenshade, 181 Thirty-second street, has been appointed agent for the Waverley electric. Display rooms have been opened in the Blenheim garage, 144 Twenty-sixth street.

Boston, Mass.—The Frederick E. Randall Co. has taken over the agency of the S. G. V. from the Boston Motor Co., the latter finding that its other agencies took up much of its time. Salesrooms have been opened at 1008 Boylston street.

Saginaw, Mich.—The Bolton Auto Co., distributor for the Studebaker corporation and Hudson Motor Car Co. for northern Michigan, has considerably increased its floor space and added a new department to its business by the wholesaling of accessories.

Baltimore, Md.—The new offices and showrooms of the International Motor Car Co., Mack and Saurer truck representative in Baltimore and the state of Maryland, have been opened. They are located at 30 South Hanover street and occupy five stories.

St. Paul, Minn.—Construction has begun on a new service garage for the Foster-Lawrence Co., agent for the Stearns and Detroit electric, at Grand avenue and St. Albans street. The building will cost $15,000 and will be ready May 5. It is to be 50 by 150 feet, of brick and steel, and

New Agencies Appointed by Pleasure Car Manufacturers

Baltimore, Md.	William Marburg	Mercer	
Baltimore, Md.	Beechler and Ogden Motor Co.	Krit	
Baltimore, Md.	R. M. Upton	Palmer-Singer	
Bridgeport, Ill.	J. A. Woods	Cole	
Brooklyn, N. Y.	Gayton B. Ellis	King	
Dubuque, Ia.	Byrne Bros. Tr. & Carriage Co.	Franklin	
Flushing, N. Y.	Jockers and Stack	Cole	
Huntington, W. Va.	Hugh G. Nicholson	Reo	
Indianapolis, Ind.	Archey-Atkins Co.	Stutz	
Kingston, N. Y.	Oppenheimer Brothers	King	
Knox, Ind.	R. D. Peters	Cole	
LaCrosse, Wis.	Elsen and Phillips	Cole	
Los Angeles, Cal.	United States Motor Car Co.	King	
Midland, Tex.	George Elliott	Cole	
Mt. Carmel, Ill.	H. H. Kamp	Cole	
Pittsburgh, Pa.	Bishop and Ports, Inc.	Rauch & Lang	
Shreveport, La.	Carl Barrett	Lozier	
Shreveport, La.	D & K Auto Co.	Maxwell	
Shreveport, La.	D & K Auto Co.	Great Western	
Sapulpa, Okla.	Sapulpa Motor Car Co.	Cole	
Toronto, Can.	Fairweathers Ltd.	Cole	
Topeka, Kans.	J. G. Vogt	Cole	
Wilkesbarre, Pa.	Dr. F. P. Archer	Hupmobile	
Wilcox, Pa.	F. R. Brown	Franklin	
Wheeling, W. Va.	Joseph J. O'Keefs	Franklin	
Worcester, Mass.	W. A. Bancroft	King	
Yazoo City, Miss.	The Garage	Cole	

equipped with modern motor generator system for taking care of forty electrics.

Spokane, Wash.—T. J. and J. C. Strong have entered the motor field in this city with the Bergdoll car.

Oshkosh, Wis.—The foundry of the Termaat & Monahan Co., engine manufacturer, was ruined by fire last week. It will be rebuilt at once.

Baraboo, Wis.—Philbrick & Mather have broken ground for a new garage building of fireproof construction. This is the fifth garage in Baraboo.

Syracuse, N. Y.—F. C. Benson, manager of the James Auto Co., has secured the agency for central New York for the Federal truck and the Paige-Detroit.

Washington, D. C.—The local branch of the Goodyear Tire and Rubber Co. is erecting a three-story building at 1014 Fourteenth street. The entire building will be utilized.

Denver, Colo.—J. H. Childs has established headquarters for the Colorado distribution of the O'Neill tire protector with the Wood-Wight Mfg. Co., 1620 Broadway.

Portland, Me.—The new address of the Goodyear Tire and Rubber Co. branch will be 646 Congress street. I. W. Penniman, late at the company's branch at Boston, has been appointed local manager.

Washington, D. C.—James J. Flynn, who has been manager of the Zell Motor Car Co., has resigned to accept the position as manager of the Locomobile branch. J. E. Macdonald, the former manager, has gone to Philadelphia to join the Packard sales force.

Superior, Wis.—J. G. Barnsdale, who recently announced his intention of manufacturing motor trucks and light commercial vehicles, has organized the Continental Truck Mfg. Co. with a capital stock of $50,000. E. M. Anderson is associated with Mr. Barnsdale in the venture. Plans for manufacturing have not been completed.

Brockton, Mass.—Plans have been approved for a two-story addition to the garage of W. H. Marble on Alton street that will more than double the present space.

Hyannis, Mass.—The Cape Cod garage was completely destroyed by fire recently and fifteen motor cars were burned, entailing a total loss estimated at about $25,000.

Indianapolis, Ind.—R. H. Schmittdiel, who recently has been manager of the Nebraska Regal Sales Co., of Omaha, Neb., is now connected with the Empire Automobile Co., in the capacity of assistant sales manager.

Boston, Mass.—Stephen Richards has been placed in charge of the newly opened salesrooms of the Cataract Tire Co., of Buffalo, at 1002 Boylston street, Boston. This office will be the distributing branch for New England.

Medford, Mass.—The Boston Motor Wagon Co., which has the agency for the Detroit Motor Wagon, has been moved from the Motor Mart in Boston to 144 Washington street, Medford, where Manager G. Frank Davenport has opened salesrooms.

Milwaukee, Wis.—The Sigmund Auto Truck Co. has been organized here with a capitalization of $50,000 by Nicholas W. and B. P. Marx and Jesse L. Stroede. The corporation intends to manufacture motor trucks, but is not ready to announce its plans.

Toledo, O.—Ten counties in Ohio and Indiana have been added to the territory through which the Blevins Auto-Sales Co. distributes E-M-F and Flanders cars. Coincidental with this action the Studebakers have changed their branch at South Bend, Ind., into a retail store which with the territory surrounding will now be supplied from Toledo.

Findlay, Ohio—A. F. Hayman & Son have opened a repair shop and installed a light and power plant.

Columbus, Wis.—Schunk Brothers have opened a garage in the Jackson building and will represent the Ford.

Portage, Wis.—Arthur Williams has established a tire and vulcanizing shop and will represent several manufacturers of motors and engines.

Atlanta, Ga.—Work has been started on the wrecking of the old Peel residence, at the corner of Merrits avenue and Peachtree street, and as soon as the ground is cleared a building will be erected there for the southern branch of the Locomobile company.

Hartford, Conn.—The Stoddard-Dayton Motor Co. has filed a certificate of organization with the secretary of state, naming as its officers Walter D. King, of Hartford, president; Wallace L. Hale, of Glastonbury, vice-president, and Wells H. Wetherell, of Hartford, secretary-treasurer. The company handles the Stoddard line.

Indianapolis, Ind.—A six-story building will be erected at Senate avenue and St. Clair streets by the J. I. Case Threshing Machine Co., which has outgrown its present quarters in Kentucky avenue. The first floor of the new building is to be devoted to the sales department of the Case motor cars. The new building will cost about $100,000.

Baltimore, Md.—Norwood Brothers, Inc., have moved into their new garage and offices at 207 North street. The company has the local agency for the Seitz, Lincoln and Elmore cars. J. E. Norwood, of this firm, is also president of the Automobile and Accessories Mfg. Co., which will likewise make its headquarters at the new North street building.

Albany, N. Y.—Kingsbury-Leahy Co., capital stock, $40,000; to deal in motor cars and motorcycles; incorporators, J. S. Kingsbury, S. M. Kingsbury, E. W. Leahy.

Arlington, Mass.—Wetherbee Brothers Co., capital stock $20,000; incorporators, I. L. Wetherbee, C. A. Wetherbee.

Augusta, Me.—International Trolleymobile Co., capital stock, $1,000,000; R. E. Ahern, president; C. H. Gilmore, treasurer.

Augusta, Me.—Auto Tractor Co., capital stock, $100,000; incorporators, L. J. Coleman, R. S. Buzzell, M. M. Spinney, E. M. Leavitt, E. J. Pike.

Baltimore, Md.—Charter Automobile Co., capital stock, $750,000; incorporators, C. R. Foutz, W. E. Bayard, G. H. Reinhart.

Biddeford, Me.—Etchells Auto Co., capital stock, $10,000; incorporators, J. Etchells, C. V. Tanner, A. L. Roberts.

Boston, Mass.—Williams Auto Co., capital stock, $2,500; incorporators, W. T. Hanley, J. F. Hanley, F. W. Ryan.

Boston, Mass.—Punctureless Tire Co., capital stock, $15,000; incorporators, W. E. Ridell, J. H. Smith, F. H. Jenkins.

Boston, Mass.—Worcester Auto Parts Co., capital stock $10,000; incorporators, J. N. Heald, C. N. Cowan, J. A. Doane.

Boston, Mass.—Cut-Price Automobile Supply Co., capital stock, $10,000; incorporators, L. S. Rothenberg, I. J. Rothenberg, H. L. Rothenberg.

Brooklyn, N. Y.—T. F. P. Co., capital stock, $1,000; incorporators, E. Mulder, F. W. Olmstead, J. R. Mulder.

Buffalo, N. Y.—South Buffalo Garage; capital stock, $3,000; incorporators, W. F. Coatsworth, L. R. Jenkins, M. L. Coatsworth.

Recent Incorporations

Buffalo, N. Y.—Eadie Vehicle and Gear Co., 464 Ellicott Square Bldg., capital stock, $200,000; to manufacture motor cars; directors, John M. Eadie, G. P. Keating, S. H. Miller, W. J. Donovan, H. G. E. Smith.

Chicago—Illinois Motor Patents Corp., capital stock, $5,000; incorporators, W. D. Kirk, E. C. Marsh, G. E. Daniels.

Chicago—Pilot Automobile Co., capital stock, $5,400; to manufacture motor cars and accessories; incorporators, W. A. Dugane, C. H. Rodenbach, A. E. Pattison.

Chicago—Union Electric Engineering Co., capital stock, $2,500; to manufacture electric motors and machinery; incorporators, A. A. Worsley, W. P. Stuart, H. Krause.

Cleveland, O.—B. M. O. Truck Co., capital stock, $5,000; to manufacture motor cars; trucks, etc.; incorporators, R. A. Wilbur, A. S. Dole, M. M. Coyne, C. C. Wise, C. S. Wachner.

Dover, Del.—Sanitary Service Co., capital stock, $10,000; to deal in motor car attachments.

Easton, Pa.—Lafayette Motor Car Co., capital stock, $30,000; to manufacture and deal in motor cars; incorporators, R. N. Fulton, R. W. Bowlby, F. C. Rockafellow.

East Orange, N. J.—Kadiz Newark Motor Truck Co., capital stock, $200,000; to manufacture motor trucks; incorporators, G. P. Kallberg, L. L. Dunn.

Erie, Pa.—Erie Taxicab Co., capital stock, $6,000.

Manhattan, N. Y.—National Tire Co., capital stock, $50,000; to manufacture motor car tires; incorporators, H. Davies, T. H. Hopkirk, I. V. Weishrod.

New York—Auto Import and Specialty Co., capital stock, $15,000; incorporators, E. P. Weiss, H. Gurlitt.

New York—Taxicab Service Co., capital stock, $5,000,000; incorporators, L. Robinson, B. Bag, S. J. Trainer.

New York—Long Island Auto Truck Co., capital stock, $3,000; incorporators, W. L. Woodill, P. J. Fisher, W. J. Backman.

New York—Auto Transportation and Sales Co., capital stock, $1,000; incorporators, E. E. Manning, W. Landseadel, J. Martin Berk.

New York—National Tire Co., capital stock, $50,000; to manufacture motor car tires; incorporators, H. Davies, T. H. Hopkirk, L. V. Weisbrod.

New York—Auto Truck Storage and Exchange Co., capital stock, $20,000; incorporators, H. J. Benjamin, L. H. Moos, L. O. Rothschild.

New York—Ohio Tire Co., capital stock, $500; to manufacture tires and accessories; incorporators, S. Kessel, F. Karpowitz, M. Karpowitz.

Philadelphia, Pa.—Glover Automobile Co., capital stock, $5,000.

Roslyn, N. Y.—Remsen & Hewlett; capital stock, $15,000; incorporators, S. L. Hewlett, J. F. Remsen, N. H. Remsen.

Yonkers, N. Y.—Hudson River Automobile Co., capital stock, $500; incorporators, C. Wieland, R. Jeggle, C. Schmied.

Yonkers, N. Y.—Park Hill Auto Co., capital stock, $15,000; incorporators, E. Drewitz, Emil Drewitz, Paul T. Ellenbogen.